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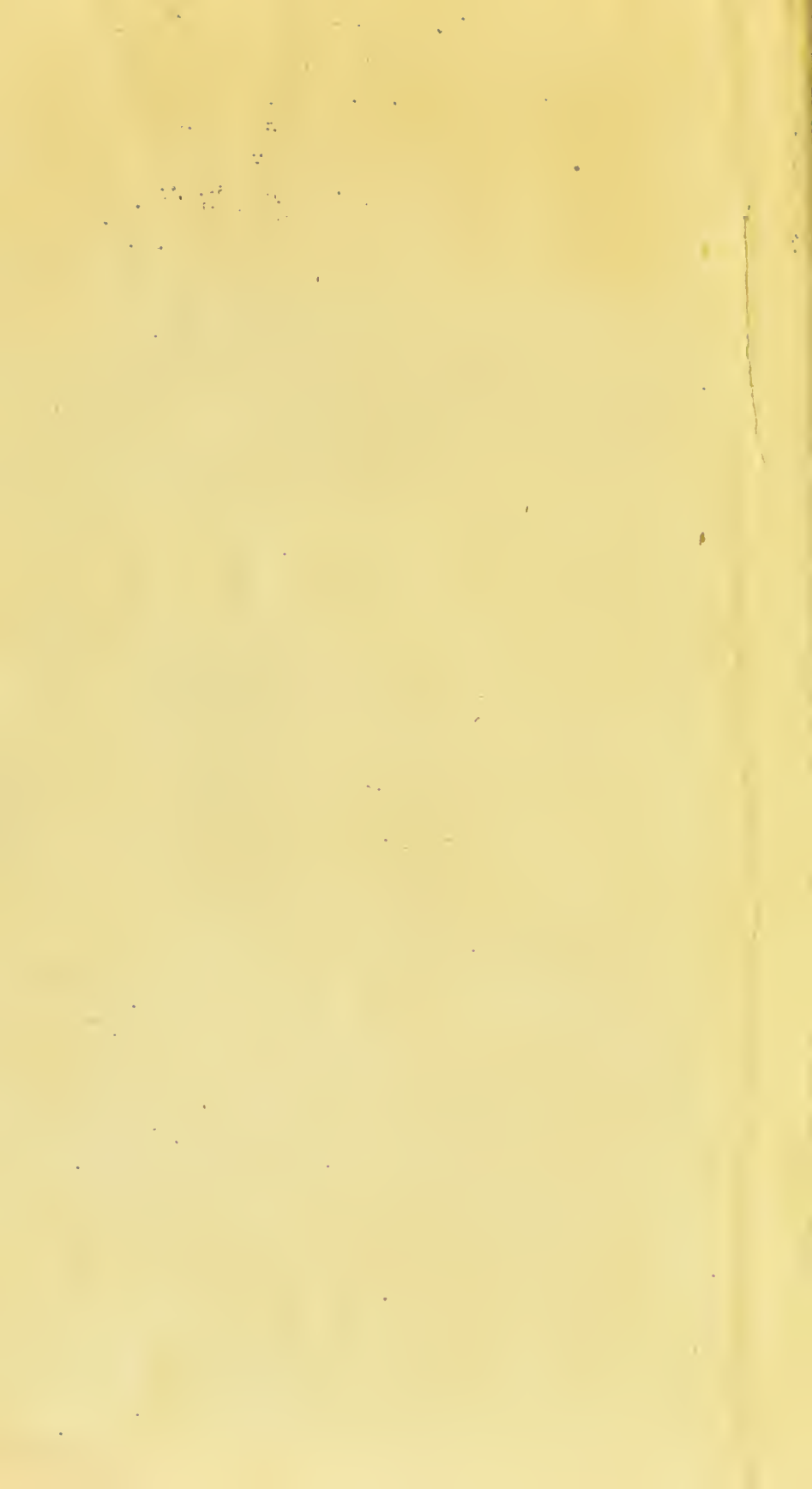
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TREATISE

ON

CHRONIC RHEUMATIC ARTHRITIS,

OR

RHEUMATIC GOUT.



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A TREATISE

ON

RHEUMATIC GOUT,

OR

CHRONIC RHEUMATIC ARTHRITIS OF ALL
THE JOINTS.

BY

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Illustrated by Woodcuts and an Atlas of Plates.

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DEDICATED

TO

SIR BENJAMIN BRODIE, BART.,

IN TESTIMONY OF THE BENEFIT

HE HAS RENDERED TO SCIENCE AND HUMANITY BY HIS SUCCESSFUL EFFORTS

TO IMPROVE OUR KNOWLEDGE OF

THE PATHOLOGICAL ANATOMY AND SURGICAL TREATMENT OF

DISEASES OF THE JOINTS.

P R E F A C E .

HAVING for a series of years—indeed I may say for a quarter of a century—paid much attention to the disease it is the object of the following Treatise to describe; and having had ample opportunities in the House of Industry Hospitals of studying it, not only in the living, but in the dead, I at length venture to submit the result of my investigations to the judgment of the Profession.

This Treatise embodies the substance of the Clinical Lectures* which for many years I have delivered on the cases of Chronic Rheumatic Arthritis placed under my care in hospital, and it comprises, also, the principal part of various communications I have made from time to time relative to this dis-

* “ Il y a, en effet, deux manières de faire connaître ses travaux et ses opinions sur quoi que ce soit: les livrer à l'impression, ou bien les exposer dans des leçons publiques.”—BLANDIN.

ease which have been already published. Hence, therefore, although the work contains views with reference to this disease having, perhaps, some claim to originality, still it cannot be expected that it will be found to suggest much which can now be considered new, or which has not, either by myself or others, been already laid before the Profession.

As, however, information relative to this disease was only to be acquired by a vigilant search into the reports of Medical Societies, not easily accessible to the student, and in the journals of the day, &c., it has long since appeared to me that a *monograph* on the subject was called for, and hence the publication of the present Treatise.

The pages of the work will be found to be interspersed with numerous woodcuts; and I have associated with it an Atlas of Drawings taken from remarkable specimens of this disease which our Museums contain.

I am not without a hope that these Drawings, while they may make the necessary details of Cases and Post-mortem Examinations clearer and less tedious than they otherwise would be, may, at the same time, render the professional eye, as it were, more familiar with the general aspect of these abnormal forms, whether noticed in the living patient

or morbid specimen, and thereby, perhaps, prove the means of preventing errors.

Indeed, it must be confessed that heretofore the diagnosis of this disease, even as to the anatomical characters of it, has been placed on most uncertain foundations, as may appear by referring to numerous cases contained in this volume. To show that such mistakes have not been confined to Great Britain, we may refer to Cruveilhier, who says, "That as bony vegetations form around the articular surfaces as a result of this disease, and as the heads of the bones become depressed, as it were, crushed down and deformed, any one unacquainted with the disease would be tempted to believe the bones had been fractured." Indeed, he adds, he has in his experience known such mistakes to have occurred many times in cases in which the hip and shoulder-joint have been the seat of these organic lesions. This author further, as a clinical physician, laments how little this disease was known, and adds that he felt "persuaded that it was habitually confounded with gout, rheumatism, and even white swelling, and that it was often combated by very active treatment, the inutility of which he believed to be the least of the evils attending it." *

* "Anatomie Pathologique." Par J. Cruveilhier. Livraison ix. page 10.

I trust it will be found that in this volume, whether the disease is considered as it presents itself in the hip, shoulder, knee, or any other of the articulations whatsoever, the anatomical characters and the symptoms of it are fully given, and the means of diagnosis pointed out.

It is true that little which can be considered satisfactory has been advanced on the important subject of medical treatment; but I believe it will be admitted that the proper steps to be taken previously to our venturing to lay down the principles of treatment of this disease, with any prospect of success, should be that which we have adopted here, namely, to establish well what are the true anatomical characters, the symptoms, and diagnostic signs of the disease.

I am not prepared to say that these preliminary investigations (which the modern state of science at all events demanded, and which have been but recently completed) must of necessity be followed by the discovery of a means of cure of this chronic disease; but I do not hesitate to state, that by adopting the course above recommended we pursue the most rational means for arriving at this desideratum, so anxiously to be sought for, and of so much importance to humanity to attain.

In confirmation of these views, I do not think I can

refer to any authority which ought to have more weight than that of the celebrated physician, the late Dr. Baillie, of London, who, on the subject now under consideration, thus expresses himself:—

“An advantage arising from the more attentive examination of morbid structure is, that we shall be able to distinguish between changes which have some resemblance to each other, and which have generally been confounded. This will ultimately lead to a more attentive observation of symptoms while morbid actions are taking place, and be the means of distinguishing diseases with greater accuracy. When this has been done, it will be likely to produce a successful inquiry after the most proper treatment.”

The task of preparing for the press the present work has occupied me many years, having been often interrupted by various other professional avocations; and I fear that it should not have been even yet accomplished, were it not for the assistance of many friends. Among these I must first name Professor Smith, the Curator (indeed I may say, fabricator) of the Richmond Hospital Museum, who has been much associated with me in prosecuting most of the post-mortem examinations which have been brought forward to illustrate the anatomical characters of this disease.

It will be also found, in reading this Treatise, that I have largely quoted many of the valuable observations on this disease that the Professor has himself already published.

To the accomplished scholar and man of science, Dr. W. D. Moore, I am indebted for the Index which accompanies this volume, as well as for much valuable assistance while the work was going through the press. The woodcuts have been executed, as to the first half of the volume, by Mr. Hanlon, and the remainder by Mr. Oldham, and will, I think, be found to do credit to the established character for skill of these artists. As to the lithographic drawings, I leave them to speak for themselves; they have been printed by Messrs. Hullmandel and Walton, of London, and drawn from nature by Mr. Conolly, so well known in this city for his faithful delineations of disease.

STEPHEN'S-GREEN, DUBLIN,

Oct. 1, 1857.

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ERRATA.

Page 57, line 4 from bottom, *for* 1836 *read* 1835.
" 84, " 18 from top, *for* bone *read* bones.
" 168, " 3 from bottom, *for* basis *read* bases.
" 236, " 6 from bottom, *for* bases *read* base.
" 352, " 5 from top, *for* noetæ *read* noete.

A
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P A R T I.

T H E D I S E A S E C O N S I D E R E D G E N E R A L L Y.

C H A P T E R I.

H I S T O R Y O F T H E D I S E A S E.

TH E disease which I am about to describe in the following pages has been already adverted to by medical writers, who have given to it different names, as it presented itself in different regions of the body. Thus, when the wrists, hands, and feet have been affected by it, the disease has been denominated "Rheumatic Gout," but when the shoulder, elbow, or knee-joints have been either singly or simultaneously engaged, it has generally been named "Chronic Rheumatism."

It is well known that this same malady sometimes fixes itself in the various structures which enter into the composition of the hip-joint, producing a chronic

disease of this articulation which has been termed "morbus coxæ senilis," and under this head the complaint has received a separate consideration from clinical physicians and surgeons.

About half a century ago a very eminent physician of Bath, Dr. Haygarth, saw the propriety of giving a distinct consideration to this peculiar affection of the joints, and, observing that it did not answer to the description of either gout or rheumatism, suggested as a proper designation for it the term "*Nodosity of the joints*," deriving his ideas, we may suppose, as to thus naming this disease, from the hard swellings he observed around the several smaller joints, particularly of the fingers (see Atlas, Plate VI., Figs. 1, 2). He added, that by thus giving to the disease a distinct name, he trusted that it might be considered as a separate genus, and become a more special object of medical inquiry.

Although Sir Benjamin Brodie,* Mr. Key,† and Lobstein,‡ as well as Mr. Benjamin Bell, have all since made allusions to this disease, Cruveilhier seems to me to be the next writer|| who has specially called attention to it, and pointed out the propriety of studying, with reference to each other, its symptoms in the living subject and its anatomical characters in the dead.

"This disease," says Cruveilhier, "has been for a long time attended to, so far as to its anatomical characters, but it would appear," he adds, "that the time

* In his work on the Joints.

† Med.-Ch. Trans., vol. xviii.

‡ In his "Pathological Anatomy," tom. ii.

|| 1829-35, "Anatomie Pathologique."

had arrived when it should claim the attention of the *clinical* physician ; that its symptoms and treatment should get more consideration ; and, in a word, that it should take its place in the nosology of the joints" (or, to adopt the words of this eminent French physician "prendre rang parmi les maladies des articulations"). This disease, he thought, was the more deserving of attention because he felt persuaded it was habitually confounded with gout, rheumatism, and even white swelling, and often combated by measures and by treatment, the inutility of which he believed to be the least of the evils attending on them. He has denominated the disease "usure des cartilages articulaires," thus, it is true, assigning to it "a local habitation and a name." The term, however, here suggested by Cruveilhier, it is plain, would localize the disease too much, confining it merely to one of the articular textures, whereas we know that, when fully formed, most, if not all, of these textures are found to be implicated ; and as to the term "*Nodosity* of the joints," although it is now nearly half a century since it has been proposed by Haygarth, it has been very partially, if at all, adopted. Indeed, the swellings of the joints which we notice in this disease are by no means hard, as the term "nodosity" would imply ; on the contrary, as in its early stages, the swellings are principally constituted by the effusion of much synovial fluid into the interior of the joint, they are soft and fluctuating. Besides, the term "nodosity" could only be properly applied to those knobby tumefactions of

the smaller and more superficial joints, as those of the hands and feet, and to the advanced stages of the disorder ; and such a term could not with propriety be made use of, with any idea of thereby correctly designating the condition of the larger joints, such as those of the shoulder and knee, when severely affected by this peculiar disease.

While I agree with Haygarth and Cruveilhier, that it is a matter of much importance to give to this disease some special designation, so that it may get a distinct consideration from the profession and the public, I find, equally with them, the difficulty of proposing any unobjectionable name for it. Its symptoms, like those of "chronic rheumatism," are slow in their progress, and of a sub-inflammatory nature, and the joints, large and small, are the principal seats of it ; it is, therefore, a "chronic arthritis," or "chronic inflammation of the joints," partaking more of the rheumatic character than of any other with which I am acquainted. With such ideas, I have long since ventured to name the disease "*Chronic Rheumatic Arthritis*," and under this head have communicated to the "Pathological Society" here many facts and observations on the malady ; and indeed, in this city at least, I may say, that the term is now current with the profession.

Some years ago I endeavoured to draw attention to this disease by reading a paper* before the Medical Section of the British Association, at their meeting at

* See "Athenæum," September 10, 1836: "Report of the Proceedings of the British Association."

Bristol in September, 1836. I then adduced cases and exhibited specimens illustrative of its anatomical characters in almost every joint in the body. On that occasion I remarked that this disease had attracted much attention for many years previously from the profession in Dublin, particularly so far as the hip-joint was concerned; and that, although nothing had been *printed* on the subject in that city previously to Dr. R. W. Smith's valuable paper in the sixth volume of the "Dublin Medical Journal," yet the clinical lectures delivered by Mr. Colles and Mr. Wilmot in Steevens' and Jervis-street Hospitals, and subsequently by myself, were calculated to make known not only the symptoms, but also the anatomical characters, of the "chronic rheumatic arthritis," as it affected the articulations in general, and in particular the hip-joint,—I may add, that I have subsequently published, in the "Cyclopædia of Anatomy and Physiology," many original observations on this disease, as it affected the different joints, the abnormal anatomy of which it fell to my lot to describe.

Besides Professor Smith's essay on this disease, as it affects the hip-joint, he has from time to time adduced at the meetings of the Pathological Society specimens showing its effects on the articulations of the clavicle, lower jaw, tarsus, shoulder, and spine. Nor should I here omit to refer to the "Notes on the Morbid Anatomy of Chronic Rheumatic Arthritis of the Shoulder and other Joints,"* by Mr. Edward Canton of London.

* See Medical Gazette, 1848.

CHAPTER II.

CAUSES AND SYMPTOMS OF THE DISEASE.

BEFORE I enter into an inquiry as to what may be considered the ordinary *causes* of this disease, I beg, in the first place, to state that chronic rheumatic arthritis may be looked upon sometimes as a *constitutional*, and sometimes as a *local*, disorder. For example, when we observe it at the same time affecting almost all the joints in the same individual on both sides symmetrically, we may feel assured that the chronic articular affection in such a case has proceeded from some deep constitutional taint. In the majority of such cases we shall, I believe, discover that the general chronic affection has been immediately preceded by an attack of rheumatic fever, from the lingering remains of which, the chronic rheumatic arthritis had evidently sprung. Moreover, if we seek for the original cause of the rheumatic fever in many of those cases in which it has thus unhappily merged into a chronic disease, we shall find the attack rationally attributable to the imprudent exposure of the person of the patient to cold and humidity,

and to the night air, at a time when he had been much predisposed to illness by having been placed under depressing influences. We can refer to many cases contained in the following pages exemplifying the truth of these observations.

In other instances we have known the chronic disease we are here considering originate, and without any precursory fever, from the sudden exposure of the person to cold at a time when the body had been much overheated by hard labour. The abrupt suppression of an habitual transpiration from the feet, by the patient having been kept for a long time standing in water up to the knees, I have also known give rise to the first symptoms of this chronic disease, which has in the end become general over the whole system, and has ultimately implicated most of the articulations, and thus become a severe constitutional malady.

On the other hand, the disease seems sometimes to appear quite as a *local* affection. Dupuytren has remarked "a variety of the wrist-joint" which is to be seen in certain labourers who, by over-exertion, stretch the ligaments of the wrists; as, for example, those who work the lever of the printing press, &c. The result of this habitual over-exertion of the wrist-joint is to produce effects on the osseous structures which we have found analogous to, if not identically the same as, those which are the result of long-continued chronic rheumatic arthritis.

As a purely local disease it is also frequently found to have originated in accident. Haygarth gives the

case of an adult man who violently sprained his wrist, and in whom this disease immediately appeared in the structures of the injured articulation, and remained confined to it.

I have seen some instances in which the hip-joint was the seat of this disease as a local affection, in which, from some special causes, it so happened that an inordinate amount of exertion had been for a considerable time thrown on one of the hip-joints, which at length became affected by this chronic disease. I may also mention that I have known cases in which severe concussions communicated to a large joint, such as that of the shoulder or hip, have been fairly assigned as the determining causes of chronic rheumatic arthritis* in these articulations. It must, however, be admitted, that we meet with many examples of this disease for the origin of which no rational cause can be assigned, and then it is said to have had a spontaneous origin.

SYMPTOMS OF THE DISEASE.

I believe I cannot convey better an idea of the symptoms of this disease than by giving a condensed account of the observations of previous writers on this subject, and by comparing their observations with those of the medical men of this city, where the affection has been studied with much care, both as to its symptoms and pathological anatomy.

Haygarth, in his work already referred to, ob-

* See the case of Mr. Mathews the comedian.

serves that, "The term rheumatism has been applied, without sufficient discrimination, to a great variety of disorders, having but few symptoms except pain, which connect them together." He adds:—"A case happened to occur to my observation at a very early period, which, compared with others at subsequent times, convinced me that there is one painful and troublesome disease of the joints of a peculiar nature, and clearly distinguishable from all others by *symptoms* manifestly different from the gout, and from both acute and chronic rheumatism."

This peculiar disease he called, as already mentioned, *Nodosity of the Joints*, and from accurate notes and tables kept by himself, he calculated that in the practice of his profession he encountered it once in every 310 patients.

The swellings of the joints, which he denominated "Nodes," he considered were almost peculiar to women, and observed, "that they generally showed themselves about the period of life when the menses naturally cease." "Out of thirty-four cases," he says, "I find two where the knees only were attacked; in all, or nearly all the rest, the hands, chiefly the fingers, were affected." He adds: "These diseased joints generally suffer pain, especially at night, but in a less degree than might be expected from such a considerable morbid change; they feel sore to the touch; in one case the patient was attacked with severe spasmodic pains; as the disease increases, the joint becomes distorted, and *probably* in bad, inveterate cases, *even* dislocated, and its motions become gradually

more impaired. In a few patients a *crackling noise* was perceived in the joints when in motion, particularly in the neck ; the skin seldom or never appears inflamed ; the nodes appear most nearly to resemble gout."

Out of the number of cases above stated, there was only one man : he appeared to be about fifty or sixty years of age. He ascribed the complaint to a fall, which violently strained his wrists and fingers, which were the only seat of the "nodes" in this case. But in the female constitution it is seldom confined to so few joints. He further says : "This disease does not affect the muscles."

Cruveilhier, in speaking of the symptoms of this disease, truly observes, "that the victims of it suffer and complain of a singular rigidity in the affected joints ; they feel and hear a kind of *crackling* in the exercise of their joints, and these movements are always accompanied with pain. The *crackling* sensations felt in the joints, and this rigidity of the limbs, followed by pains, are very considerable at the moment the patient commences to move about, particularly in the morning, after the repose of the night."

Haygarth's observation, that this disease does not affect the muscles, requires explanation. We are, I think, to infer from it, that the muscles are not organically affected, as are the joints and surrounding structures. Any one who has seen much of the malady must have noticed, that when it is general in the constitution, there is no one symptom more complained of by the patient than the painful *spasms*

of the muscles ; indeed, Haygarth has himself said, that in one case the patient was attacked with severe spasmodic pains.

The last-named author observes, “ that the joints under the influence of this disease gradually increase, and become harder.” This last observation, as to hardness, must apply to the joints of the fingers, or to the latter stages only of the disease in other articulations, because, as I have already mentioned, in the early stages of this affection the principal enlargement of the joints arises from the effusion of a large quantity of fluid into the synovial sac. Hence the swellings we observe are soft, and afford evidence to the touch of fluctuation in them.

We might infer from the observation of some, that this chronic disease affects elderly persons only, and many are so prepossessed with this idea, that they would class it among the *senile* diseases ; but this is an error. I have seen it in patients under the age of twenty, as a general or constitutional disease, affecting many of the joints simultaneously.

Haygarth considered the disease common among females, but so rare in the male, that (although we know he had been studying it for twenty-six years) he states he had only noticed the case of one man affected by it.

Upon this question, as to what is the comparative frequency of the affection as I have found it occurring in the male and female, I would say, that men seem to me to be on the whole as subject to chronic rheumatic arthritis as women ; but that, if we make

the comparison in different joints, we shall find men more affected with this disease in the hip-joint than women; and that the wrists and hands are much more frequently engaged in the female patient.

Haygarth and Cruveilhier both allude to a remarkable symptom of this disease which some writers have overlooked, and others but slightly mention, namely, that the movements of the articulations affected with it are generally accompanied with a *crackling noise*; the former writer says:—"In a few patients a crackling noise was perceived in the joint when in motion, particularly in the neck." I have noticed this phenomenon very generally in almost all the joints affected by this disease. In a case I have elsewhere* given of it affecting the knee, I have alluded to it in the following words:—"When we grasp and flex the leg or the thigh, at the knee-joint, we find we can elicit a peculiar articular crepitus;" in the case in question it was quite audible, and resembled much the noises which accompany the discharge of electric sparks, when emitted in quick succession from an electric apparatus. This symptom of crackling produced on the movement of joints affected with this peculiar disease, I have never known to be more remarkably illustrated than by the case of the late Dr. Perceval, who was for many years afflicted with this malady in both his hip-joints. He often called the attention of his attending physician to the succession of loud crackling sounds, to be heard by every one present in the room whenever he arose slowly from

* "Cyclopædia of Anatomy," Art. Knee-joint.

his chair. These sounds, he felt himself, were distinctly referrible to the motions on each other of the altered articular surfaces of the hip-joint.

Haygarth seemed to think that the disease attacks persons in the higher and middle, rather than in the lowest, ranks of life. Sir B. Brodie observes, "that in his experience it will be found most in those who have led luxurious lives, and have not been accustomed to much bodily exercise, and is of opinion that too great indulgence in animal food is more likely to produce it than the free use of fermented liquors.

Although we witnessed this disease in persons of all ages and ranks, our experience in this city makes us rather concur with Dr. Robert Todd than with the foregoing writers. He says :*—"It is to be observed more among the labouring poor than among the higher classes." We also believe, with him, that the disease is more common in Ireland than in England. I have found more numerous specimens of it in the museums of Holland than I have seen elsewhere, if I except those which are to be found in the pathological collections in Dublin.

The description Sir Benjamin Brodie has given of this disease, in the recent edition of his work (1850) on the Joints, seems to have been taken from the observations he has made on it as it appears in the wealthier classes of society, in whom it presents more of the gouty than of the rheumatic character. "The patient," he says, "who is afflicted with this disease,

* Todd on "Gout and Rheumatism."

which he calls 'rheumatic gout,' in addition to his local ailments, always suffers, in a greater or less degree, from the usual effects of dyspepsia, which are aggravated by want of exercise; he is liable to acidity of the stomach and flatulence after his meals, is nervous and irritable, and every error as to diet, as well as all mental excitement, will produce an aggravation of both the constitutional and local symptoms."

In his experience he has found that in a few instances the disease, after having reached a certain point, becomes stationary, or there may be, apparently, some degree of improvement, but except when it was treated in the very earliest stage, he does not recollect any one case in which there was anything approaching to a cure. In the majority of cases this disease is progressive, the joints becoming more and more disorganized, sometimes with little, at other times with much, increase in size, and the increase depends not only on the cause before adverted to, but also on a deposit of new bone in the neighbourhood of the affected joint, and sometimes on that of a gouty concretion in the surrounding cellular tissue. "*Anchylosis*," he adds, "sometimes takes place as an ultimate result, but there is little tendency to supuration."

I readily agree with Sir Benjamin Brodie that the enlargement in, and around the affected joints, which we notice in the earlier stages of this disease, arises principally from the increased effusion of fluid into the synovial sac of the articulation, the result of the chronic synovitis, which at this period exists.

In the later stages of the affection, exostotic growths can occasionally be felt through the integuments, to spring from the margins of the articular surfaces, as well as from the periosteum and bone in the neighbourhood of the diseased joint. As to the knee, rims of new bones can be felt to range themselves along the margins of the condyles of the femur and tibia. (See Atlas, Plate VIII., Fig. 2, *c, c*). In the vicinity of the hip-joint the great trochanter and the horizontal ramus of the pubis may be found enlarged.

The synovial bursæ in the neighbourhood of the affected joint are occasionally found distended, and add to the apparent bulk of the articulation; some of these bursæ are merely offsets* from the larger synovial sac of the joint; some are completely isolated, having no communication whatever with the cavity of the articulation.

It is no uncommon circumstance to observe, when the elbow-joint is the seat of this disease, that the bursa of the olecranon process shall become enlarged, and contain small "foreign bodies" in its interior. It is true, also, that synovial cysts become, as it were, accidentally developed in the cellular tissue surrounding the affected articulation, having, as already mentioned, no communication whatever with the diseased joint. As the disease advances, the fluid contained in these cysts may become absorbed, and the bursa converted into a small solid tumour, but we have never met with the gouty concretions mentioned by

* See Plate IX., Fig. 8, *A*.

Sir Benjamin Brodie, nor have we found in our post-mortem examinations any white chalky layers of lithate of soda deposited on the articular surfaces in any case which we considered to have belonged to the class we have called cases of chronic rheumatic arthritis.

There is another point I wish to advert to, in which we find that our experience in this disease does not correspond with that of Sir Benjamin Brodie. In his observations "on chronic disease of the joints connected with gout and rheumatic gout," he speaks of *anchylosis* as being an ultimate result of this disease, which may be expected. That he does not by this observation intend to allude merely to the articular rigidity which belongs to this disease, is plain, for he evidently seems to contrast this state of rigidity and anchylosis: for he says, "some are *completely anchylosed*, and others are so stiff as to be nearly useless."

I would not be understood to deny that true bony anchylosis is not occasionally to be seen as the result of chronic rheumatic arthritis. Indeed I shall hereafter have occasion to refer to the dissection of a case of this disease in which this process had taken place among some of the *bones of the carpus*; but as, after many years' investigations and many dissections, this has been the only specimen of "true bony anchylosis" I have met with, I think I may conclude that anchylosis, as an ultimate result of this chronic rheumatic disease, must be considered as very rare. Indeed, if we carefully examine the notes of the only

case adduced by Sir Benjamin Brodie in support of his opinion as to ankylosis, we find that from external examination only he inferred that the joint of the right elbow, together with several joints of the fingers and toes, were ankylosed; but the only *proof* of complete bony ankylosis having taken place in any of the joints, ascertained by dissection, are contained in the following words, in the report of the post-mortem examination in this case:—"In the right wrist the first row of the carpal bones were ankylosed to each other, and to the radius." And here let me advert to an interesting example of the disease I have called chronic rheumatic arthritis, given by Cruveilhier, which may show how a good observer might easily fall into the error of imagining that complete bony ankylosis existed in many joints, had he relied on external examination only.

"La plupart des articulations étaient le siège d'altérations plus ou moins considérables, et nommément les articulations scapulo-humérales, les genoux, les coudes, qui *semblaient ankylosés*, en sorte, que cette malheureuse était condamnée à garder le lit dans un état d'immobilité presque complet et à recourir à l'autri pour subvenir à ses besoins naturels. La malade attribuait sa maladie à un rhumatisme goutteux dont elle aurait été tourmentée dès sa jeunesse. Cette malade s'étant morte, je trouvais toutes les articulations dépourvues de cartilages avec déformation plus ou moins considérable des surfaces articulaires. *Il n'y avait pas d'ankylose*; mais les os étaient maintenus dans l'immobilité par suite de cette déforma-

tion des surfaces articulaires et par la rétraction des ligamens.”*

For my part, I have met with many examples of this disease, in which the stiffness and immobility of the joints were found to have arisen merely from the alteration in form the articular surfaces had undergone. I have seen, for example, the orbicular head of the femur converted into an oval form, forbidding any other motion than that of a very slight flexion on the pelvis; I have found the head of the radius at the elbow-joint to have assumed, instead of a circular, an oval,† and occasionally even a quadrilateral form as to its outline, preventing altogether the normal movements of pronation and supination; yet in no instance have I known the hip, knee, or elbow to exhibit any example of *true bony ankylosis*, nor have I discovered any specimen of solid union of the bones, except in one dissection of the carpal region.

Upon the whole, then, it would appear, that articular rigidity, or false ankylosis, is not an unusual consequence of this disease, but that true bony ankylosis, in which it is to be understood that there is complete fusion together of the two bones, which then form, in reality, but one, is, as the result of this chronic rheumatic arthritis, exceedingly rare.

It has not escaped Sir Benjamin Brodie's observation, that this disease has but little tendency to suppuration. In this remark I entirely concur with this

* “Anatomie Pathologique,” par J. Cruveilhier. Paris: Livraison xxxiv. p. 1.

† See Atlas, Plate iv. Figs. 1, 2.

eminent surgeon. Indeed, for the many years I have been communicating observations to the Profession on this affection, I have always taken pains to point out this remarkable character of chronic rheumatic arthritis, viz., that the inflammation of the structures of the joint in which the disease consists seldom goes on to suppuration. I say seldom, because I do not mean to assert that instances do not occasionally present themselves in which an attack of acute arthritis may be seen to have supervened on chronic rheumatic arthritis, and that in such cases inflammation may proceed to the formation of purulent matter in the cavity of the articulation; indeed, I have known fatal cases of this description. All I would be understood to assert is, that a case of chronic rheumatic arthritis does not, in its ordinary course, proceed to suppuration, as other inflammatory and sub-inflammatory affections of the different articular textures usually do.

CHAPTER III.

DIAGNOSIS AND PROGNOSIS.

As to the *diagnosis* of this disease, Haygarth,* the earliest writer on the subject, thus expresses himself:—
“The nodes appear most nearly to resemble gout;
“both of them are attended with pain and swelling
“of the joints, but they differ essentially in many
“distinguishable circumstances. In the gout the
“skin and other integuments are generally inflamed,
“with pain, which is often acute, soreness to the
“touch, redness and swelling of the soft parts, but
“in no respect like the hardness of bone. The gout
“attacks the patient in paroxysms of a few days,
“weeks, or months, and has complete intermissions,
“at first for years, but afterwards for shorter periods.
“The gout attacks men much more frequently than
“women.

“There is one distressful circumstance which distinguishes this disease: it has no intermission, and
“but slight remissions, for, during the remainder of

* “Clinical History of the Nodosity of the Joints,” by John Haygarth, M. D. Bath, 1805. Page 150.

“the patient’s life, the nodes gradually enlarge, impeding more and more the motion of the limb ; the malady spreads to other joints without leaving or producing any alleviation in those which had been previously attacked.”

In one case he says :—“I find the fingers, wrists, knees, ankles, elbows, shoulders, neck, and hips, were all affected with this disease at the same time, that is, thirteen joints, exclusive of the numerous joints of the hands : if each individual joint of the hands had been taken into the account, they would have amounted to above *three* times that number, perhaps not fewer than forty. The malady had been rapidly advancing for ten years.

“These nodes in their gradual progress sadly embitter the comforts of life, but I know no instance in which they seemed to shorten its duration. The first patient which I saw in the disease lived to attain the age of ninety-three years!”

When the disease assumes a local form, and only engages one articulation, as, for example, the hip, the patient, though affected by a lameness, which every year gradually somewhat increases, as his general health is unaffected, may find out many occupations, to the exercise of which his local disease offers but little impediment. Quite the reverse is, however, the case when the disease has appeared as a general constitutional affection, and when many of the articulations of the same individual are simultaneously implicated. The patient’s rest at night is then usually disturbed ; he is affected by every change in the

atmosphere; all the movements of his joints are painful to him. The prognosis in such a case is very unfavourable, and little in the way of remedial treatment can be relied upon.

Those of the lower order who are thus afflicted with this as a general constitutional disease soon become incapable of earning their bread, and most of such in this country are consequently at last found inmates of our poor-houses. In these asylums they usually spend much of their time during the winter months in their beds, and even here complain much of the cold. From want of exercise, the circulation of blood through their limbs becomes languid; the joints become rigid as well as painful; the surrounding muscles, through disuse, fall into a state of atrophy. The bones and the cartilages also degenerate, and in some cases, from constant immobility of the joints for years, we have found the articular surfaces to have in points coalesced with each other, and in these points of contact a species of red vascular union of the surfaces to have taken place (see case of M'Garry). When all the joints of the lower extremities are the seat of the disease, the patient frequently becomes altogether bedridden, and the knee-joints and those of the feet become distorted, and even dislocated. The former joints are habitually kept semiflexed, the leg becomes rotated outwards, and under these circumstances we have known partial luxations of the patella occur. The patient usually becomes much stooped in his figure, the spinal column being flexed forward. The neck often becomes

rigid, and this state of things, too, is sometimes found associated with a rigid condition of all the joints, great and small, of the upper extremities. Now, the patient, although he has laid before him food convenient for him, soon becomes really incapable of feeding himself, and thus in a certain sense becomes wholly dependent on others. I have, no doubt, observed many unhappy victims of this disease the inmates of poor-houses, who, had they been placed in more favourable circumstances as to fuel and clothing, might have lived for years with this malady, carried off unexpectedly during the winter months by sudden attacks of other diseases, such as dysentery or diarrhœa, produced by cold. Some have died of acute inflammations of some of the viscera; others of chronic phthisis.

Those who are placed in better circumstances, who can provide themselves with the comforts and conveniences of life, who can clothe themselves warmly, and who, although unable to walk, can be daily furnished with the means of taking exercise in the open air,—these, so far as my observation goes, seem to live as long as any of those of the same period of life who are free from the disease.

CHAPTER IV.

ANATOMICAL CHARACTERS OF THE DISEASE.

HAYGARTH, who has so well described the symptoms of this disease under the denomination of nodosity of the joints, does not seem ever to have made even one post-mortem examination with a view to ascertain the morbid changes induced by it in the various structures of the articulations. His observations, or conjectures rather, with respect to these changes, are comprised in the following words:—

“In this disease the ends of the bones, the periosteum, capsules, the ligaments which form the joints, gradually increase; these nodes are not separate tumours, but feel as if these were an enlargement of the bones themselves. This point might be ascertained without any difficulty or doubt.”

If we except the few, but precise, observations of Cruveilhier, those of Professor Smith, and the communications of Mr. Canton, as well as those which I have myself made,—if, I say, we except these, little has been hitherto done to make the profession practically acquainted with the anatomical characters of this chronic disease.

I shall now proceed to describe the alterations of structure I have found induced by this disease, in the different tissues composing the articulations :—

1. In the fibrous and synovial tissues.
2. In the cartilaginous and fibro-cartilaginous.
3. In the osseous structures.

ALTERATIONS IN THE FIBRO-SYNOVIAL STRUCTURES OF THE JOINTS, PRODUCED BY THE DISEASE.

If we have an opportunity of making a post-mortem examination of an individual who, at the time of his death from some other disease, had been affected by chronic rheumatic arthritis in its early stages, in this case the fibro-synovial capsules of the affected joints will be seen to present evidence of having been the seat of inflammatory action of a chronic nature. These capsules will be found to be thickened, and at the same time distended, with a preternatural quantity of synovial fluid. This observation will be verified if, for example, we thus are afforded an opportunity of examining anatomically a knee or a shoulder-joint in the early stage of this disease. At this period a state of the articulation, formerly called *hydrops articuli*, will be seen to exist (see Atlas, Plate ix. Fig. 1). The synovial membrane will be found to be thickened, and internally to present a red colour; vascular tufts, red and hypertrophied synovial fimbriæ, will be seen in the joint.

In the more advanced stages the redundant quantity of fluid will be found to have been removed by

absorption; and the capsular membranes of the joints to have acquired preternatural density. Thus we have seen the capsular ligament of the hip-joint to be nearly a quarter of an inch in thickness; and, as to structure, to present almost a resemblance to intervertebral substance; and, we may add, examples have not been wanting in which portions of bone have been found contained in the substance of the fibro-synovial capsules of the joints.

When the capsular membranes have been cut through, and the interior of the joints which have been long affected exposed, we may very generally observe that some of the normal structures have been altogether removed; in the hip-joint not a vestige of the round ligament will be seen; nor of the long tendon of the biceps or glenoid ligament in the shoulder-joint; and all the articulations, great or small, which have been long affected, are usually divested of their cartilages of incrustation.

The interarticular fibro-cartilages, too, are also, with very few exceptions, absorbed when the disease has existed long in any joint normally possessing these structures. I have proved the truth of this observation by my examinations of the articulation of the lower jaw, and of the sterno-clavicular joints, as well as, also, by my inquiries into the condition of the wrist-joint. Not a vestige of the interarticular fibro-cartilage will be found in the post-mortem examination of these joints, if they had been *long* and severely affected by the disease.

The same observation also applies to the knee-

joint; in every well-marked case of this disease I have examined anatomically (with two or three singular exceptions), the semilunar cartilages have been absorbed as completely as the cartilages of incrustation of the heads of the bones. In one of the exceptions referred to, the cartilages were hypertrophied (Atlas, Plate VIII. Fig. 3). In another case the semilunar cartilages (M'Garry) were partly ossified. The fibrous brim which, in the normal state, surrounds the glenoid cavity of the scapula, as well as that which completes the cup of the acetabulum of the hip-joint, are altogether removed under the influence of the morbid processes induced by this peculiar disease.

We may conclude that the lateral ligaments of the ginglymoid joints must be preternaturally elongated, in consequence of the necessary elongation and over-distention of the capsules, by the effusion into the joint of an increased quantity of synovial fluid, phenomena which occur in the early stages of this disease; and we may readily infer that these lateral ligaments will be very slow to recover the effects of the stretching they have been subjected to. From such causes a certain degree of abnormal mobility sometimes exists in the affected joints.

This mobility is not always observable in advanced cases of this disease, in consequence of the semiflexed state of the limbs and spastic condition of the muscles; but we have frequently found that the lateral ligaments of the smaller ginglymoid joints, from the causes already adverted to, have become so lax as to have permitted of partial or even complete disloca-

tion, an observation which may be illustrated by referring to many of the examples I shall have occasion to allude to.

The capsular ligament of the arthro-dial and enarthrodial joints are also very slow to recover the effects of the over-distention they too had undergone in the early periods of this disease ; and these capsules, thus elongated and relaxed, may be also supposed to admit of dislocations of the bones. Hereafter, when speaking of the shoulder-joint, I shall have occasion to show that a sub-luxation of it is by no means an uncommon result of chronic rheumatic arthritis of this joint ; and I may add, that from this cause not having been generally known to anatomists and surgeons, many, very many, mistakes have arisen.

These observations, relative to the displacements of the bones I have noticed to occur as the result of chronic rheumatic arthritis of long standing, do justice to the sagacity of the following observation of Haygarth :—"As the disease increases, the joint becomes distorted, and probably, in bad inveterate cases, dislocated."

FOREIGN BODIES.

The description of chronic rheumatic arthritis would be very incomplete, whether we allude to the symptoms of this peculiar affection or to its anatomical characters, were we to omit noticing, more fully than we have yet done, those "*foreign bodies*" which are generally to be found in the joints of patients who have suffered for a long time and severely under

this disease. I do not pretend to assert that articular "foreign bodies," as these are called, are not occasionally to be found in the interior of the joints of patients who present no symptoms of the chronic disease I am describing; but, on the other hand, I feel persuaded that some of the published cases of foreign bodies removed from the interior of the articulation of the knee by surgical operation were cases in which these foreign bodies constituted but one *symptom* or part only of the disease I have named chronic rheumatic arthritis. That these foreign bodies frequently exist in the joints of individuals who have long suffered from this disease is amply proved by our observation on the living and the dead; and in illustration of this important practical point, I shall hereafter take occasion to refer to numerous specimens extant in various museums, in which preparations the simultaneous coexistence in the same joints of these foreign bodies with the eburnation of the articular surfaces, bony vegetations, &c., may be observed, and from all which we may feel convinced that these foreign bodies must be looked upon as belonging to the ordinary signs of this chronic rheumatic disease.

In some cases they exist in very considerable numbers. Haller found twenty small cartilaginous bodies in the synovial sac of the lower jaw; Morgagni twenty-five in the left knee-joint of an old woman; and I have delineated the preparation of an elbow-joint in the Museum of the Richmond Hospital, in which the synovial sac contained no fewer than forty-five foreign bodies. (Atlas, see Plate v.) Some are

small, and others of very considerable magnitude. I shall elsewhere in these pages refer to several cases in which the knee-joint had been the seat of these foreign bodies, of a very large size, for example, an inch and a half or two inches in diameter.

In all the above-mentioned instances of foreign bodies found in the various joints, in the cases of Haller and Morgagni included, these foreign bodies are in my opinion to be looked upon as the products merely of chronic rheumatic disease.

The consistency of these foreign bodies is various; sometimes they have the appearance of cartilage throughout their substance, at other times we find them bony in their centre, and cartilaginous in their circumference. In certain cases they will be found to possess a softer cellular nucleus, enveloped by a cartilaginous crust or covering; on the other hand, they have been seen to be bony throughout. Occasionally they are made up of many little bony lobules united by means of very short ligamentous fibres. In almost all cases, it is probable that they are enveloped by synovial membrane, to which they owe their smooth and polished surface.

When we come to inquire into the mode of development of the foreign bodies, we must, in the first place, recollect that the synovial membrane of the joints is, no doubt, the structure in which is laid the foundation of the chronic, as it is of the acute rheumatic arthritis. In the substance of this membrane, now in a morbid condition, or in the cellular structure immediately subjacent to it, is deposited

the particle of lymph, which, soon becoming organized, forms a small tumour, which projects slightly in the interior of the synovial sac of the joint,—and this I believe to be the first step towards the further development of the foreign bodies found in the interior of almost all the synovial sacs. At first the small tumour has its basis broad, and seems immediately connected with the subjacent part. By degrees it advances into the interior of the synovial cavity, and thus its basis, at first comparatively broad, becomes narrowed into a neck, which gradually elongates, and becomes more and more attenuated, so as to form a lengthened pedicle or funis, connecting the little body to some of the various structures in the interior of the joint. Thus the foreign body may be connected by means of a slender ligament to bone ; sometimes to the interior of the capsular membrane ; sometimes to cartilage or to fibro-cartilage, &c. (See Plate VIII. Fig. 3.) This slender connecting ligament permits a certain extent of motion to the foreign body, so that, without losing its attachment, it may appear within certain limits in different parts of the cavity. Lastly, when many of these foreign bodies exist simultaneously in any one joint, they have been found adherent one to another (see Plate v.), and also to the interior of the capsular membrane, by means of similar long ligamentous filaments. In one case I have seen in the shoulder-joint the foreign body nearly two inches long, and of a crescentic figure, which seemed to embrace the anatomical neck of the humerus with its two cornua, and

the latter adhered by their extreme points to the synovial membrane, investing this portion of the neck of the humerus within the joint. (See Plate II. Letter *g*.) Also, but rarely, these foreign bodies have been found free in the interior of the articulation; once I have seen one embedded in a receptacle formed for it in the back part of the condyle of the femur. (Museum of College of Surgeons, London.)

Some writers, with Monro, are of opinion, that bony foreign bodies found in the interior of the joints owe occasionally their origin to the accidental detachment of a piece of bone from the articular surfaces: thus, Sir Benjamin Brodie says: "In one case in which I had an opportunity of examining the parts by dissection, besides some loose cartilages having the usual appearance, I found another loose body of an irregular shape, with one surface smooth and cartilaginous, and the other surface having a thin layer of bone adhering to it, being evidently a portion of the articular surface actually broke off from the head of the tibia. That such an accident should occasionally happen from any sudden or violent motion of the joint, with a hard body loose in its cavity, is no more than might reasonably be expected."

On the other hand, we must, I imagine, look upon such cases as exceptions, as Sir B. Brodie would appear to do, because we find these "foreign bodies" under many circumstances in which they could by no possibility have owed their origin to any accidental detachment of a fragment of either cartilage or bone. I have seen these rounded bodies, for example, at-

tached by a short pedicle to the thin edge formed by the concavity of a semilunar cartilage, to the fibres of the anterior crucial ligament,—nay, more, I shall also have occasion to refer to one case, in which numerous foreign bodies existed in the interior of the synovial sac of the knee-joint,—and close to, but *outside** of, the synovial membrane, in the popliteal region, were also to be seen rounded foreign bodies, exactly of a similar nature to those attached to the inside of the synovial sac.

Besides this first species of foreign, also called “pendulous bodies”—so well known to the profession since the time of Ambrose Paré—either formed of cartilage and of bone, and free, or connected by means of a slender filament to the interior of the joint, there are other species of productions to be found within the joints which require some observations from me, while I am considering the anatomical characters of chronic rheumatic arthritis. Foreign bodies of this second species, which I have ventured to name “*additamentary bones,*” are usually to be found deepening and enlarging the cavities of reception for the heads and condyles of bones composing the articulations. I have only noticed these productions in joints which have been long and severely affected by this peculiar disease. When the brim of the acetabulum of the hip-joint is rendered—as it very frequently is by this disease—preternaturally deep, the

* Museum of the College of Surgeons of England, 954. Vol. II. p. 236, of the Catalogue. This specimen presents all the anatomical characters of chronic rheumatic arthritis. It was presented by Mr. Lawrence.

increased depth is usually owing to the addition of pieces of bone which appear to me to be newly formed (see Plate VII. Fig. 3, *b, b*). These osseous productions also seem, in some rare cases, to render the glenoid cavity of the scapula larger and deeper, thus, as it were, better to accommodate the head of the humerus, which usually becomes enlarged under the influence of this disease. There is a remarkable preparation of a shoulder-joint in the Museum of the College of Surgeons in this city, which will exemplify the ultimate effects of this chronic disease on the bones of the shoulder-joint. The head of the humerus is greatly enlarged; the surface of the glenoid cavity is covered with porcelain-like enamel, and its posterior margin is much deepened and widened by the addition of several pieces of bone, evidently of new formation. These, six in number, are of a somewhat pyramidal form, each being fully as large as one of the carpal bones (Atlas, Plate IX. Fig. 7). In this case these additamentary bones seem to have been, as it were, designed by nature to enlarge and deepen the glenoid cavity of the scapula, and to make it better suited to accommodate the enlarged head of the humerus.

Dr. O'Beirne and I had, from time to time, under our care in the Richmond Hospital, a patient (Lynch) who had chronic rheumatic arthritis in both knee-joints. He was ultimately removed to the North Union Poor-House, where he died of chronic disease of the bladder; and on a post-mortem examination having been made, by Mr. R. Smith, of the affected

joints, besides numerous foreign bodies of the description first adverted to (Atlas, Plate VIII. Fig. 3, B), there were to be seen six or seven additamentary bones, which seemed to supply the place of a portion of the inner condyle of the tibia, which, under the mysterious influence of this peculiar disease, had been removed without suppuration (see Plate VIII. Fig. 2, and Fig. 4, A, A).

The bony additions which we occasionally find made to the articular surfaces and processes of the elbow-joint, when it has long suffered from the effects of this disease, come under the same denomination (see Plate IV. Fig. 4, A, G).

Some might be inclined to suppose that, in some of the specimens I have adverted to, the appearances of the joint might be accounted for by referring them to the accidental detachment of fragments from the edges of the articular surfaces, and suspicions might well arise in the mind that such really was the case, so far as some of the examples I have adduced may be concerned; but, in my opinion, no doubt whatever can exist as to the shoulder-joint already alluded to, and represented (Plate IX.) The numerous irregularly-shaped bones which, in this specimen, deepened the glenoid cavity, could never have been supplied by fragments (properly so called) detached from the edges of the original articular surface.

These pieces of bone which have been found in the articulations, when affected by this disease, must, in my mind, be considered as new products, and as the result of the ossification of the structures in the im-

mediate vicinity of the joint, and it is reasonable to suppose that they owe their existence to the irritation produced by the disease we are here endeavouring to describe.

Lastly, under the influence of the morbid process which goes on in the interior of the joints under the name of chronic rheumatic arthritis, membranous productions, or "vascular excrescences," are to be found in almost all the articulations affected by this chronic disease. They are usually found in the recent state, highly red and vascular. Anatomists have noticed, that in almost all the joints vascular synovial fimbriæ exist at the margins of the cartilaginous surface. They are to be seen in the normal state of the joint, surrounding the neck of the femur and humerus, as well as elsewhere. These fimbriæ, under the influence of disease, become hypertrophied, and present very remarkable appearances, which have not been much noticed by pathological anatomists. Those enlarged fimbriæ, "or vascular excrescences," from the interior of the synovial sacs of the joints, seem specially to exist in cases in which the disease called chronic rheumatic arthritis had commenced in a joint, and they are to be found in a comparatively early period of the affection. Cruveilhier observed them in the knee-joint of an individual who had also other signs, in the same knee-joint, of the disease we are endeavouring to describe in this work.*

On two occasions at meetings of the Pathological

* See Liv. ix. Plate vi.

Society in Dublin, during the sessions 1839-40, I called the attention of the Society to the recent post-mortem appearances presented by the structures of the hip-joint, in rather an early stage of chronic rheumatic arthritis. In these examples, on opening the thickened capsular ligament, the shortened neck of the thigh bone was beset inferiorly by a countless number of highly red, villous-looking productions of the synovial membrane. These were of a rounded, conical form, about half an inch long, and two or three lines in thickness at their bases.

Similar productions from the synovial membrane are to be seen on making the post-mortem examination of the shoulder and other joints of individuals who had been affected with the chronic disease we are here considering, as we shall hereafter have occasion to show.

ALTERATIONS FROM THE NORMAL STATE PRODUCED BY THIS DISEASE IN THE OSSEOUS SYSTEM.

The cartilaginous incrustations which invest the articular extremities of the bones are, under the influence of this chronic disease, altogether removed; and when the disease has been of long standing, the place of the cartilage thus removed is usually supplied by an ivory-like enamel, remarkable for its fine polish and hardness. In the first class joints, such as those of the hip and shoulder, the surface of the head of the femur or humerus becomes, in whole or part, as smooth as an ivory ball. In the ginglymoid joints,

such as the knee and elbow, the place of the removed cartilage is supplied by means of patches of ivory or porcelain-like enamel, marked by parallel grooves hollowed out in the direction of the movements of flexion and extension. These grooves are usually seen on the condyles and trochlea of the femur, and on the posterior or articular aspect of the patella (Atlas, Plate VIII.)

As soon as the cartilages have been removed, under the influence of the peculiar morbid processes which are set up by this disease, the denuded bony surfaces, not having been organized to bear the effects of friction and attrition, are partially worn away, and a smooth enamel is formed by the mutual action of the bones on each other. Around the articular surfaces, thus mechanically acted upon, bony vegetations arise. The heads of the bones, thus enlarged, and sometimes flattened, get the appearance as if they had been crushed down. The necks of the humerus and femur become gradually shorter, from a species of interstitial absorption they undergo, and, under such circumstances, we can easily imagine that any one not familiar with these anatomical characters of this peculiar disease, might be led to infer, when they met with them, that they had before them specimens of fractures of the anatomical neck of the humerus, or even of an intra-capsular fracture of the cervix of the femur which had been united by bone. That such mistakes have often been made in these countries, we have unfortunately too many cases to prove; and we may cite the authority of Cruveilhier to show,

that elsewhere also these appearances have been misunderstood.

As the heads of the bones are greatly enlarged by this disease, the cavities for their reception are found to be proportionably expanded. In many cases these sockets are rendered much deeper than natural, and in others they are found shallower and otherwise deformed, as will be more particularly adverted to when each articulation shall be specially considered as affected by this disease.

As this chronic disorder, if it be general in the system of the joints, imposes on the sufferer the necessity of being almost constantly confined to the house, or even to his bed, we might expect to find, on making a post-mortem examination of the osseous system of such patients, that we should find it in a condition approaching to atrophy; and that this is, in reality, frequently the case is not to be denied; but, on the other hand, when in our anatomical investigations we notice the articular surfaces to have been much worn by this disease, we find the shafts of the bones are variously affected.

In some instances these preserve their normal condition; in others they are greatly enlarged in different parts, and have become, consequently, heavier than natural. This increase of weight, however, does not arise merely from the external enlargement of the bone, but, when the interior of the osseous structure has been exposed by a section having been made through it with a saw, the bones are, by this means, shown to have attained great hardness and

density, as many examples, hereafter to be referred to, will verify. In one instance (Mary Keefe) the lower jaw had its right ramus one inch longer than the left, and the condyle on this side was three times larger than natural (see Plate I.) In another case of this disease, the ulna and olecranon process had attained a gigantic size. (Atlas, Plate IV. Fig. 4.)

All these cases show that although in this disease the articular surface may suffer from the effects of weight, pressure, and friction, the parts of the bone in the immediate vicinity of the articular surfaces exhibit the effects of a preternatural growth of bone, and that even the irritation in which this disease consists, whatever it be, does not confine itself merely to the wearing away of the cartilage or the enlargement of the articular *heads* of the bones; but that, in some cases, the *shafts* and centres of the bones themselves become hypertrophied (see Plates).

CHAPTER V.

TREATMENT OF THE DISEASE.

ONE of the most important questions relative to this disease we have now to determine is, whether it should be considered of an inflammatory nature or not, and certainly this is a question which should be answered before the subject of the treatment of it is considered.

The late Dr. Colles, who had paid much attention to this disease, was known to have called in question its inflammatory nature. In making a communication to the Pathological Society here, he said, in reference to this affection, that "He did not think that genuine inflammation had anything to do with its origin, for nothing like pus or lymph had ever been found in the affected joints." "If it be inflammation," he adds, "it has not the characters or consequences of true inflammatory action."*

Dr. Robert Todd would refer the phenomena this disease presents rather to *irritation* than to chronic inflammation. He says: "The rheumatic affection of

* See Dublin Journal, First Series, vol. xv. p. 498.

the joints may be most correctly described as an abnormal nutrition, occasioned by the presence of a peculiar matter in the nutrient fluid, affording, doubtless, certain points of resemblance to chronic inflammation, yet differing from it in a very marked manner." He adds: "The term chronic rheumatism of the joints seems to me, therefore, less liable to objections than chronic rheumatic arthritis, proposed by Mr. Adams.*"

On the other hand, we find that many consider the disease to be of a sub-inflammatory nature. Although Haygarth has not formally expressed any opinion on this question, yet we can reasonably infer that he looked upon it as one of a chronic inflammatory character from the treatment he advised.

Cruveilhier says: "This disease is one of the most serious and constant of the effects of inflammation (be it acute or chronic) of the synovial membranes; this effect continues although the cause on which it may have depended may have ceased." He adds: "That in all cases of this disease, where we have an opportunity of making an early post-mortem examination, we find unequivocal signs of inflammation of the synovial membrane, characterized by great development and redness of the synovial fimbriae, and destruction of the cartilage." In another place, he designates the disease as "une inflammation chronique de la synoviale."

Sir Benjamin Brodie, in his work already cited,

* Todd on Gout, &c. London, 1843.

says: "In this disease inflammation of the synovial membrane is the first of a series of changes which the joint undergoes, and which in the course of years ends in its entire disorganization." Again, he says: "Although opportunities of examining the pathological condition of the joints, which are affected in this manner, are only of occasional occurrence, there is no surgeon of much experience who has not seen many cases of the same disease in the living person, or who, having seen them, will not assent to the correctness of the observation which I have already made; that inflammation of the synovial membrane is the first of a series of changes which the joint undergoes. This is clearly indicated by the symptoms."

Indeed, if we look to the ordinary causes of this disease, we shall find them to be just such as we might suspect would be most likely to give rise to a disease of an inflammatory nature. For example, accidents, such as sprains and concussions of the articular surfaces, have been known to give rise to this chronic disease as a local affection, and its constitutional form has appeared, in numerous instances, to have been the result of rheumatic fever, and occasionally, too, of puerperal arthritis, the inflammatory nature of which diseases cannot well be questioned. Finally, let us look to the phenomena which chronic rheumatic arthritis presents, when it appears in a large and superficial joint, as, for example, the knee in the living patient. Here we perceive swelling, heat, and learn that the patient is suffering pain, and if redness, one of the essential signs of inflammation already men-

tioned be not visible externally, yet, whenever an opportunity has occurred of making a post-mortem examination, so as to expose to view the interior of one of these affected articulations, we have invariably found in the redness of the synovial membrane and fimbriæ, and in the inordinate effusion of synovial fluid, as well as in the hyperemic condition of the bones themselves, very decided evidences of previous inflammatory action having existed.

Haygarth, who first called the attention of the profession to this disease, thought it necessary to apologize for the scantiness of the information he had to communicate to the profession and the public upon the subject of its treatment.

“As it has not hitherto claimed the particular attention of medical men, we cannot,” he says, “reasonably expect that a full trial should have been made of remedies best adapted to remove or alleviate its symptoms.” To which the modern physician has to add, that, although for the last few years strenuous and successful efforts have been made to put the profession in possession of its anatomical characters and symptoms, it is to be lamented that the knowledge thus attained does not appear well calculated to remove our doubts that we shall ever be able to suggest effectual means of curing this disease, when once fully established; because we find that the articular structures soon become altered or

removed by it; and we are not aware of any powers existing in the constitution capable of *reproducing* the delicate articular structures, such as cartilage, fibro-cartilage, &c. In the commencement, however, of the disease, it is to be presumed that a treatment suggested, not only by the symptoms, but by what we *now* know to be the true pathological anatomy of the malady at this period, may be attended with advantage.

When we inquire into the history of the treatment this chronic disease has hitherto been subjected to, we find Haygarth thus expressing himself:—

“As far as my experience extends, much benefit was derived from the warm bath, and a stream of warm water, with the repeated application of leeches, on the diseased joints. In several very bad cases these remedies afforded manifest relief.”

“In one case,” this author says, “of an adult female, the nodes of the fingers and knees commenced, and had continued for four years, with tumours which occasioned an apparent distortion of the joints, and considerably impeded their motion. This patient received manifest advantage from the warm bath, pumping the diseased joints, and *repeated application of leeches* to them.”

Sir Benjamin Brodie, in the work already referred to, has made the following observations on the treatment of this disease. He says:—

“In the very commencement of this disease, before any actual disorganization has taken place, and while the joints affected are limited in number, I

believe that much may be done towards preventing its further progress. The patient should be placed on a careful system of diet, partaking very moderately of animal food, avoiding fruits, acids, raw vegetables, and sugar, and taking little or no fermented or spirituous liquors: he should take exercise daily, so as to induce perspiration; and if this cannot be readily accomplished, he may, from time to time, take alterative doses of the acetic extract of colchicum, combined with a small quantity of the mercurial pill, and occasional purgatives. Moderate doses of potash or magnesia may be given three or four hours after each of his principal meals, so as to neutralize any superabundant acid in the stomach. Soda should be carefully avoided, as tending, by its combination with the lithic acid, to form gouty concretions.

“According to circumstances, however, the treatment may be varied. Thus, when the patient is depressed, as sometimes happens by the use of colchicum, the mixture composed of rhubarb, magnesia, and ginger, sold under the name of ‘Dr. Gregory’s Powder,’ may be taken every night, with an active aperient at stated intervals; and very great benefit will often be obtained from a very long perseverance in the use of these simple remedies. Little is to be done by local applications. If, however, there be more than usual pain in a joint, leeches may be applied, and, on particular occasions, a bandage, not for the purpose of making pressure, but of limiting motion. In some instances a light leathern

splint, or pair of splints, may be employed with advantage. When the disease is fully established, the same kind of treatment will be useful in mitigating its symptoms, and sometimes in retarding its progress. But here the more active remedies, such as mercury and colchicum, must be reserved for special occasions. The iodide of potassium has the reputation of being useful in cases of this description; and I believe that its reputation is not wholly undeserved. It should be given only in small doses of two or three grains, twice daily, but should be continued, if it agrees with the patient, for several weeks at a time. But, after all, no general rule can be laid down as a guide for the practitioner on all occasions. Each individual case forms a study in itself, not only for the medical attendant, but for the patient also. In one case, in which the patient was afflicted with the disease in a very aggravated form, she derived considerable benefit from the use of cod-liver oil, both internally and externally."

The account given by Sir Benjamin Brodie of the symptoms patients labour under who are afflicted with this complaint, and of the medical treatment he recommends for them, seems to refer to a chronic disease more of a gouty than of a rheumatic character, and to a type of rheumatic gout which is more generally met with in the upper than in the lower ranks of life.

However we may account for the fact, certain it is that in the numerous cases we have seen of this disease in this city, we have never observed red sand

in the urine; and it is remarkable that Haygarth, of Bath, says:—"I do not recollect that in eases of nodes, any notice is taken of that pink-coloured sediment in the urine, which appears in gout or acute rheumatism."

We have not, in making our post-mortem examinations here, found any evidenee of true gout having existed, no eretaeous deposits have been observed in the bursæ, or in the neighbourhood of the diseased joints, nor any deposit of lithate of soda on their articular surfaces.

Dr. Watson in his Lectures* alludes to the form of rheumatism of the joints we are here considering, and says, that "The pain is alleviated by frietion of the joint, and the patients are most comfortable when they are warm in bed, and especially when moderate perspiration is present. They are singularly benefited also by summer weather. Persons who are much troubled by this wearing eomplaint, and who can afford to live where they please, would do well to take up their residence in a warm elimate. Wherever they may be, such patients should be protected against atmospheric vicissitudes by warm clothing. They should be cased in flannel from the neek downwards. Warm bathing is of great service, and especially baths of salt water, of a temperature not less than 100°, that they may act as a stimulus to the cutaneous circulation, warm donehes, the vapour bath, or the hot air bath, of which the patient may

* Lectures on the Principles and Practice of Physic. Third Edition. London, 1848. Vol. II. p. 683.

receive the benefit when lying in bed, and to these may be added friction with some stimulating liniment, and what is called shampooing. It is in these cases that stimulating internal medicines are often of use,—turpentine, some of the animal oils—the cod-liver oil, for instance—and guaiacum.”

He also speaks favourably of the effects of the iodide of potassium, and adds that opiates are remedial of the pain, and thinks there can be no better form for their administration than that presented to us in the celebrated Dover's powder, the *Pulvis Ipecacuanhæ Compositus* of the *Pharmacopœia*.

In considering the subject of the medical treatment of this disease, we should bear in mind that it may make its appearance in one articulation only, as, for example, in that of the hip or shoulder, as a *local* disease; or it may, as a *constitutional* affection, engage many of the articulations at the same time. In either of these two forms we have to contend against a sub-inflammatory condition of the affected joints. In the early stage of the disease there is heat of surface, swelling from effusion into the synovial sacs, and pain whenever the joints are moved. For these symptoms the treatment usually employed for an attack of chronic arthritis should be had recourse to. The highly congested and hyperemic state of the synovial structures, which recent anatomical investigations have repeatedly shown to exist, would suggest the propriety of the local abstraction of blood by cupping and leeches, particu-

larly during the earlier periods of the disease, and of the utility of these measures I can report most favourably. In a few instances the combination of sulphur, guaiacum, &c., called the Chelsea Pensioner's Eleetuary, has proved beneficial to the patient after a long-continued use of it.

Anodynes should also be employed in whatever form they are found to disagree least with the general health of the patient. A combination of Dover's powder with the watery extract of opium affords considerable relief, and may be safely persevered in for a considerable length of time. I have also known benefit derived from the use of the ammoniated tincture of guaiacum.

There is one important question which the medical attendant is frequently called upon to decide, namely, whether the patient should yield to his disorder, and condemn himself, as it were, to immobility for life; or whether he should contend against it, and persevere in walking, even though it proved painful and fatiguing. To this I would reply, that in the commencement of the disease, rest, cupping, the frequent use of leeches, confinement to a warm atmosphere, warm baths, and mercurials combined with opium, seem to be the most rational means to resort to, with the expectation of arresting the progress of the affection in its early stages; but, on the contrary, if chronic rheumatic arthritis has gone on to the destruction of articular surfaces, and the movement of the joint is followed rather by a stiffness of the limb than actual pain,—in this case some walking exercise daily may not only be per-

mitted, but recommended to the patient: his general health will be thereby improved, and the articular surfaces will be found to move more freely on each other, owing, most probably, to the eburation of them which we know to be induced by motion.

If, however, upon the one hand, it be true, that in the early stage of the disease exercise is likely to aggravate the symptoms; still, upon the other, it is important to have present to our minds the evils that result from the system of the articulations being kept for a great length of time in a state of perfect quietude; for my experience accords with that of Teissier* and Bonnet,† that prolonged and absolute repose of the joints, particularly in old persons, is calculated to determine serious alterations in the articular structures, such as effusion of a sero-sanguineous fluid into the synovial sacs, the formation of false membranes, erosion and thinning of the cartilages, &c. &c.

But it will naturally be asked, are there no thermal springs famed for the cure or alleviation of the distressing symptoms of this disease? It is said that the waters of Bath and Buxton have been found useful: those of Carlsbad are reported as being beneficial to the patient afflicted with gout; and those of Wiesbaden and Aix-la-Chapelle to such as are crippled by rheumatism; and it is imagined—not altogether without a show of reason—that the kindred complaint to these, namely, chronic

* *Gazette Medicale*, 1841. † *Maladies des Articulations*, 1845, p. 67.

rheumatic arthritis, may be alleviated as to its most urgent symptoms by a course of the waters at some of these sources of health.

The study, however, of the important subject of the treatment of this disease has not yet been sufficiently advanced to enable us to decide as to the positive or relative merits of these several watering-places ; but when the affection has become more generally understood, and distinguished from gout and rheumatism properly so called, and the results of experience have been faithfully recorded, then, and not till then, will the physician be enabled to speak more positively as to the general medical treatment, both of the local and constitutional form of chronic rheumatic arthritis.

Finally, from considering the symptoms that patients labour under who suffer from this disease, whether it assume the local or constitutional form, we may well enter into the feelings which dictated to the physician who first called especial attention to it the following words :—

“This faithful picture, drawn from nature, is here exhibited to excite the compassion and exertion of my professional brethren to prevent, if possible, so distressful a malady at *its commencement*. As the nodes at first produce but little pain or inconvenience, and are seldom or never dangerous, they rarely excite the notice which they deserve, and would obtain, if the patients were fully aware that this insidious disorder would continue for life, and would make every future day more uncomfortable.”

PART II.

CHRONIC RHEUMATIC ARTHRITIS CONSIDERED SPECIALLY IN EACH JOINT.

CHAPTER I.

THIS DISEASE IN THE HIP.

BEFORE I proceed to describe this disease as it affects any of the other articulations, I think it better to advert *first* to the characters it presents when the hip-joint is the seat of it. My apology for adopting such an arrangement is, because I believe the profession to be more familiar with it as it affects the hip, than with the phenomena it presents when any of the other articulations have become affected by it.

The earliest observer whom I can find describing, or rather delineating, the morbid appearance that a long-continued state of morbus coxæ senilis, or chronic rheumatic arthritis, of the bones of the hip-joint impresses on the articular surfaces, is Edvardus Sandifort, of Leyden, who, in his "Museum Anatomicum," published in 1793, has given very graphic illustrations of the alteration in form which

the head of the femur and acetabulum undergo as the result of this disease. This author, however, describes the appearances of the bones only as he found them in the dead body, deprived of all their ligaments and all the surrounding soft parts; but he does not adduce any living example of it, nor does he seem to be aware of the nature of the disease he has delineated.

For many years this disease, under the designation of *morbis coxæ senilis*, has been accurately described in the clinical lectures delivered in the different hospitals in Dublin, and the importance of distinguishing it from the other affections of the articulation has been pointed out. Mr. Benjamin Bell, in his work on the Bones, has, under the head of "Interstitial Absorption of the Neck of the Thigh-Bone," alluded to it, and detailed many of its symptoms, as well as the morbid changes which the neck of the bone suffers; and in the sixth volume of the "Dublin Journal," 1835, Professor Smith, in a paper on the "Diagnosis of the Injuries of the Hip," and subsequently in his "Treatise on Fractures," 1847, has given a very good and concise account of this remarkable affection of the joint.

It is now a considerable time (Session, 1831) since, in my clinical lectures, delivered in Jervis-street Hospital, I gave the name of *morbis coxæ senilis* to the disease in question. Having, however, subsequently met with many instances of it, occurring so early as at the age of thirty or forty, I have since ventured to substitute for this name that of

chronic rheumatic arthritis of the hip, considering it identical in its nature with the disease affecting other articulations, which it is the object of this work to describe.

CAUSES AND SYMPTOMS.

As to the *causes* of this chronic disease of the hip-joint I believe little is known. I have heard it frequently attributed to the effects of cold and wet; and I can easily conceive that an acute attack of rheumatic arthritis of the hip, produced by cold, may occasionally merge into the chronic affection now under consideration. I have also reason to think that falls upon the great trochanter have given rise to the first symptoms of this disease; but in many cases no satisfactory cause can be assigned for its origin.

The patient complains of stiffness in the hip-joint and about the great trochanter; of a dull, boring pain, which extends down the front of the thigh to the knee. The stiffness is most felt in the morning, when the patient commences to walk; but after some exercise the movements of the joint become more free. Should the patient have walked very much during the day, the pain is always more severe in the evening. The uneasiness, however, gradually subsides after he has retired to bed. When the patient throws the weight of his body fully on the affected joint, the pain is always increased; but if the surgeon press on the great trochanter, or adopt any other expedient, so as to push

the head of the bone even rudely against the acetabulum, these manœuvres are the sources of no uneasiness whatever to the patient. Although we can easily satisfy ourselves that no actual ankylosis exists, still it is evident enough that the motion of rotation is lost, and that flexion is confined within very narrow limits. When we place the patient in a horizontal position, and endeavour to communicate any of these movements to the hip-joint, he complains of some pain, and an evident crepitation can be heard and felt deep in the articulation. The affected limb has the *appearance* of being two or three inches shorter than the other; while, on accurate measurement, the real shortening will be found not to amount to an inch. This greater appearance of shortening than exists in reality arises from the obliquity of position of the pelvis relatively to the spine, and the elevation of the former at the affected side is such, that in the ordinary attitude of standing the crest of the ilium and the last short rib approach nearer to each other at this side by two inches than do those of the opposite side (Figs. 1 & 2, pp. 63, 64).

The patient walks very lame, and with the foot and whole limb greatly everted. The nates of the sound side is unusually prominent, while that of the affected one is quite flat, and no trace of the lower fold of the gluteus is seen (Fig. 2). The muscles of the thigh also seem somewhat atrophied; still they do not want for firmness; and we may uniformly observe that the calf of the affected limb is not in-

ferior in size and firmness to the other. When we minutely examine the great trochanter, we find it larger and more prominent than usual; and about the situation of the acetabulum, the horizontal branch of the os pubis, and the lesser trochanter, bony protuberances can, upon careful examination, usually be recognised.

This disease generally appears here as a purely local complaint, and, when once fully established in the hip-joint, rarely extends itself to the other articulations. We have known, however, the disease having commenced in the smaller joints, as those of the hand and wrists, subsequently to have affected both hip-joints in the same individual.

The chronic inflammation of the various structures of the hip-joint in which the disease consists is seldom accompanied by any appreciable degree of heat or external swelling of the soft parts, and I have never heard of the inflammation having proceeded to suppuration.

The following case will show the necessity of making the profession fully acquainted with this disease, as it proves how very obscure are the early signs of the affection, and that even the morbid appearances may be confounded with those which are the result of accident.

At the meeting of the British Association, in Dublin, in the year 1836, one of its most distinguished members, Mr. Snow Harris, of Plymouth, made the following communication to the Medical Section :—

CASE I.

“Sir A. Cooper and many other eminent surgeons had doubted the possibility of union taking place in fracture of the neck of the thigh-bone *within* the capsular ligament.

“A case had lately fallen under his (Mr. H.’s) notice, which he thought would tend to set the question at rest. About ten years ago, a gentleman, æt. 40 (the celebrated comedian, Mr. Matthews), was thrown from his gig while he was descending Ludgate-hill. He got up and walked immediately after the accident, but continued lame from that period up to the time of his death. He had been attended by some of the most eminent surgeons in London, but they had not been able to determine whether there was a fracture of the bone or not, but kept him lying on a sofa for nearly twelve months. The injured limb was shortened, the foot everted, the thigh wasted, and owing to the constant inclination of the body forward on one side, a lateral curvature of the spine took place. Some time ago this gentleman died of disease of the heart; and Mr. Harris, being anxious to examine the parts, removed the acetabulum and a portion of the thigh-bone, which he presented for the inspection of the meeting. He had found the trochanter higher up than natural, and the neck of the bone shortened: a section of the bone had been made,

and the line of union, in Mr. Harris's opinion, was clearly manifest."

When Mr. Harris exhibited this specimen to the Medical Section of the Association, it excited much interest, first as the subject of the case was an individual well known and much esteemed in this city; and secondly, as in the announcement of the history of the case it was asserted that it settled in the affirmative the much agitated question, whether the intra-capsular fracture of the cervix femoris was or was not susceptible of osseous union.

The writer was present at the communication of this case to the Section. Upon the presentation of the specimen he at once expressed his doubts that this case, either from its history or post-mortem appearances, should be considered as an example of the intra-capsular fracture, and maintained the opinion that it was a specimen of this chronic rheumatic affection, well known in Dublin at that time under the name of *morbus coxæ senilis*. In this opinion he felt assured when he inspected the acetabulum which Mr. Harris at the same time presented. In the widening of this cavity, the complete filling up of the fossa, which is normally destined to contain the substance called Haversian gland, the shortening of the neck of the femur, and the depression of the head towards the lesser trochanter, and in the ivory deposition on it,—in all these we saw nothing but the usual characters of this chronic disease as it affects the bones of the hip-joint. In this view Mr. Smith, the late Dr. McDowell, and hospital surgeons around him, con-

curred; even Mr. Snow Harris himself seemed quickly too to become a convert to our views, and I am satisfied, from what we observed of his liberality, that I have his full permission to communicate this case in its present form to the profession.*

The upper part of the head of the femur was exceedingly rough on its surface, and of an oval form from above downwards; the axis of the neck was at right angles with the shaft, and seemed to run horizontally from without inwards and backwards, so that the length of the fossa which exists posteriorly between the corona of the head and the posterior inter-trochanteric line, was in this case less than a quarter of an inch; a fossa which we know naturally measures two inches. In viewing the oval form of the head, we conclude the movement of rotation must have been impossible. From the shortening of the neck posteriorly we can infer that the toe and foot must have been greatly everted; and from the depression of the head to the level of the trochanter, that the femur must have been nearly one inch shorter than the other. The lamented individual had not suffered from the disease more than ten years, so that the morbid appearances were not to the same amount as we frequently see them arrive at, as the result of this very slow disease.

* The sketch, Atlas, Plate VII. Fig. 1, is taken from the cast of the head and neck of the femur presented by Mr. Snow Harris to the College of Surgeons, Dublin.

CASE II.

The following case is that of an individual who has been, to my knowledge, suffering for many years under this disease.

Patrick Macken, now aged seventy-seven years, was brought up as a postilion and groom, but for the last seventeen years has been quite unfit for service in consequence of his having been afflicted with a very severe pain in his right hip ; from the first attack of which he became lame, and ever since the lameness has been slowly but gradually increasing. In every other respect his health is excellent, except that he has some wandering rheumatic pains in other joints, particularly in the right shoulder. He walks with great labour and pain, and now requires the assistance of a stick in each hand ; in the morning his movements are stiff and confined, but they become freer on exercise ; in the evening of a day on which he has walked much, the pain and stiffness are worse, and increased in proportion to the amount of exercise and labour he has undergone in the day. While in bed, he rests on the affected side, and suffers no pain whatever, unless he suddenly and incautiously turns himself. As soon as he gets up and throws his entire weight on the diseased hip-joint, the pain commences ; if asked in what particular part of the joint he feels most suffering, he points to the back part of the great trochanter, and to a point which corresponds to the situation of the

lesser trochanter ; he says the pain shoots from these points down the front of the thigh to the knee.

These pains are sometimes more severe, and sometimes less, without his being able to assign any cause for these alterations ; and he cannot observe that the state of the weather has any influence whatever on them.

As he *stands* at rest, he throws the weight of his body on the left or unaffected limb, while the right leg hangs in front and slightly across the left, and *seems* to be at least three inches shorter ; he leans slightly back, and supports himself on two sticks : as he walks, the right foot is considerably everted, and when he moves without sticks (which he accomplishes with the greatest difficulty) he places the whole sole of the foot flat upon the ground. He never, however, now ventures of his own accord to move without the help of two sticks, by the assistance of which he is enabled to walk more quickly. While thus moving along, the heel of the affected limb does not quite reach the ground (Fig. 1), and the lumbar vertebræ undergo great motion. He cannot under any circumstances flex the thigh forward ; so that when he assumes the sitting position he is obliged to place himself forward on the very edge of the seat, the right thigh remaining in the same line as the axis of the trunk, the leg being usually flexed and placed under the chair or across and behind the other. He finds the utmost difficulty in putting on his stockings and shoes. He has scarcely any motion in the hip-joint. When we

view the hip in front, and examine it, we see and can feel a considerable bony fulness, corresponding to the horizontal branch of the pubis ; the trochan-

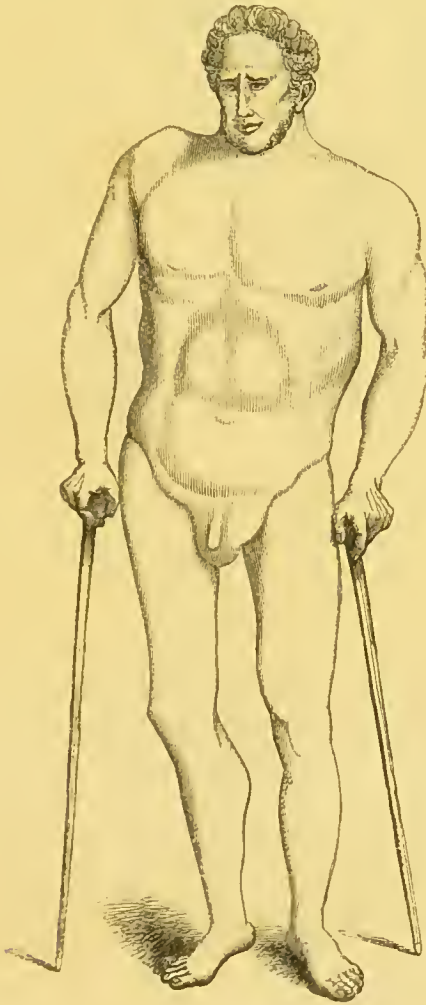


FIG. 1.

P. MACKEN'S CASE.—Spine of ilium elevated ; right leg shortened ; foot everted ; the thigh somewhat atrophied ; the calf of the leg not diminished.

ter major seems placed very high up, and is extraordinarily large, as if surrounded with ossific deposits. The thigh is somewhat atrophied, being an

inch and a half less in circumference than the other; but the calf of the leg is not reduced, and the muscles seem firm. The greater apparent than real



FIG. 2.

P. MACKEN'S CASE.—Flatness of the nates of the right or affected hip; trochanter elevated and enlarged; thigh atrophied, but calf of leg not diminished; foot everted; limb a little shortened.

shortening of the limb, when he rests on the sound one, arises from the lumbar vertebræ being much curved, the convexity being to the right or affected

side, and the pelvis being elevated at the same side ; while the real shortening, ascertained by accurate measurement, amounts only to half an inch. If we place the patient horizontally, and attempt to communicate to the hip-joint any movement, as of rotation, flexion, or abduction, a well-marked crepitus is elicited, and the range of motion is found to be very limited indeed ; a little abduction is admitted ; rotation and flexion are allowed, but to a degree scarcely more than just sufficient to prove that no actual ankylosis exists. The movements give some pain to the patient ; but we can press the trochanter firmly, so as to direct the head of the bone deep against the fundus of the acetabulum, and we can even strike the heel and sole of the foot forcibly, without giving the patient the slightest feeling of pain.*

DIAGNOSIS.

When chronic rheumatic arthritis of the constitutional form affects the hip, many of the smaller articulations are similarly implicated, and the true nature of the disease becomes thereby made manifest, but when it appears as a *local* complaint, fixing itself, as it usually does, in one of the hip-joints only,

* The above case is a reprint from the "Cyclopædia of Anatomy." London : 1839 ; vol. II. p. 800 :—"Hip-joint, Abnormal Anatomy. By R. Adams, M. D." The case has also been subsequently introduced, with the engraving, into the two following valuable works : "Treatise on Fractures, &c. By R. W. Smith, M. D., Professor of Surgery, University of Dublin." 1847. A Treatise on the Hip-joint, entitled, "Om Höftleden och Ledbrocken," &c. By Professor Santesson. Stockholm : 1849.

then the disease may be mistaken for sciatica, or for a scrofulous affection of the joint.

The strumous affection, however, occurs generally in children, and in persons under the age of puberty, while this chronic rheumatic affection of the hip seldom appears in any who are under forty years of age. It is true, that scrofulous caries of the hip-joint may attack those who have passed the age of puberty, but whatever is the age of the patient in the strumous case, we observe that the constitution sympathizes with the local disease of the hip-joint, whereas, in the chronic rheumatic affection of the local form, the general health is totally disengaged. In the case of the chronic rheumatic disease, the patient will allow the great trochanter to be firmly pressed inwards, and even permit the head of the femur to be pushed up with violence against the bottom of the acetabulum without complaining; on the other hand, the individual affected with the scrofulous complaint of the hip-joint shrinks back from submitting to these experiments, instinctively dreading the pain that should be induced thereby.

When we make the patient stand as erect as he can, in the case of the strumous disease of the hip, we observe at once the characteristic attitude of the patient, and position of the affected limb, the general fulness and swelling around the hip-joint; there is to be observed at the same time the wasted condition of the thigh and leg of the affected side. In the chronic rheumatic case, it is true, the thigh will be found also reduced in circumference, but not in firm-

ness, while the calf of the leg is as large as natural. In a word, instead of the general swelling of the nates and tapering downwards of the upper third of the thigh which is so remarkable in the scrofulous hip, there is an evident flatness in the gluteal region in the case of the chronic rheumatic affection, and in the last, behind the great trochanter (which is much enlarged and higher up than natural), the normal depression exists (see Fig. 2, page 64.)

Some of the symptoms attending on sciatica resemble those of chronic rheumatic arthritis of the hip more than those of the disease before mentioned. In sciatica the age of the patient is always mature, and the experiment of forcing up the head of the femur against the acetabulum gives no pain. In these respects sciatica and chronic rheumatic arthritis of the hip resemble each other; but in sciatica the pain extends along the back of the limb, and outside of the leg, in the course of the great sciatic nerve and its branches, and the pain also comes on in paroxysms.

In the case of chronic rheumatic affection of the hip, when it is a local complaint confined to this joint, the pain at once ceases when the patient retires to bed, and the affected limb is relieved of the superincumbent weight; but in sciatica the pain is as severe at night as at any other time.

When we examine the patient in the horizontal posture, the motions of the hip-joint, if sciatica be present, will be observed to be quite as free as usual; but, on the contrary, in the case of the chronic rheu-

matic affection, when the surgeon holds the limb, and attempts to flex or rotate the thigh, but little motion can be observed to take place in the joint of the hip, while a peculiar crepitation is perceived in it, and the lumbar vertebræ are found to be *really* the seat of many of the movements which a careless examination might lead one to suppose had taken place in the hip-joint itself. While in sciatica the limb preserves its natural direction, and is of its normal length, in the chronic rheumatic disease of the hip there is an eversion and real shortening of the limb, as well as an enlargement of the great trochanter,—all which constitute a combination of circumstances which render the diagnosis between sciatica and chronic rheumatic arthritis by no means difficult.

Before I conclude this part of my subject, I may mention, that instances do occur of persons who, having been affected with this chronic disease of the hip, have suffered contusions of this joint or fractures of the cervix and upper part of the thigh bone, as the immediate effects of falls on the great trochanter of the affected side. These occurrences may be rare, but when the symptoms which belong to the previous chronic disease and those which are produced by recent accident are found combined together, it must be confessed, they are well calculated to embarrass our diagnosis, at least until the previous history of the case be fully ascertained. A writer in the

“Gazette Medicale” in alluding to this disease says of it:—“C'est une affection particulière, presque entièrement inconnue de nos chirurgiens, et que cependant bien plus que tout autre lésion de la hanche, peut entraîner des erreurs graves dans le diagnostic des fractures du col du fémur.”*

The following case occurred to me in my hospital practice many years ago; it was carefully noted, at the time, by Dr. Power (now the eminent Professor of Anatomy at the College of Surgeons here), whom I then had the advantage of having as my pupil and clinical clerk.

CASE III.

Patrick Doolan, aged 75, was admitted into Jervis-street Hospital, February 17, 1831, labouring under a severe injury of the hip-joint. The limb presented the following appearances:—

The hip was considerably swollen, the trochanter major appeared twice its natural size, and was drawn up on a level with the anterior superior spine of the ilium; a considerable hollow was evident in the groin. The limb was shortened four inches; the foot inverted; the movement of rotation outwards could be communicated to the limb, but the motion was imperfect, and attended with pain. On making extension and then rotating the limb, an indistinct crepitus was perceptible.

* Smith, *loc. cit.*, page 127.

We collected from the patient, that a short time before his admission, while endeavouring to unlock a door, he lost his balance and fell on a heap of stones on his left hip; that he at once found he was unable to rise, and was immediately carried to the hospital. We found him in a state of exhaustion from pain and the severe shock he had sustained.

The appearances the limb presented excited a good deal of interest and doubt. It was supposed, however, that, from the previous history of the case, much might be elicited to clear up any obscurity which existed as to the immediate cause of the present unusual appearance; however, all that could be ascertained was, that many years ago he noticed a stiffness in the hip; that gradually the limb became shorter and shorter; that he contracted a halt; but that he never was confined to his bed in consequence of the affection.

The conclusion arrived at, as to the diagnosis in this case, was, that the accident was an extra-capsular fracture at the basis of the cervix femoris, with injury also done to the trochanter major, in an individual who had been, for a long time previously, affected with chronic rheumatic disease of the hip. The prognosis, in consequence of the severe and extensive nature of the injury, and the age of the patient, was very unfavourable.

The patient died about a fortnight after his admission. On making a post-mortem examination, it was found that a fracture of the cervix femoris had occurred at its root close to the trochanters. 2udly.

That the great trochanter, which was much increased in size, was broken off obliquely from the shaft of the femur; the fracture ran in such a direction as to detach the trochanter from the shaft of the bone, leaving attached to the former the insertion of the pyriformis, gemelli, obturatores, and quadratus femoris. 3rdly. The trochanter minor was also broken off, so that the psoas magnus and iliacus had lost all connexion with the femur.

The capsular ligament was found thickened, and when this was freely cut all round, it required the exertion of much force to pull the head of the femur from the socket. The ligamentum teres had entirely disappeared. The cartilage of the head of the bone was almost altogether absorbed, and in its place was deposited a complete enamel resembling ivory, smooth and polished. The head of the bone was altered in shape: it was larger than natural, and flattened on its upper surface; a quantity of bone was deposited all round the head of the femur, where it joins the neck of this bone.

The *acetabulum* was greatly enlarged and lined by the same material as that covering the head of the femur; there was no trace of the substance called Haversian gland, and the pit for its reception had entirely disappeared. When the fractured portions of the bone were restored to their original position, it was found that the neck of the femur was quite horizontal, and that from this cause, and from its increased size, the trochanter major was situated above the level of the head of the bone.

One of the most remarkable features in this accident was the extraordinary shortening of the limb, to the amount of four inches. While much of the shortening in this case was fairly referable to previous alteration of the head and neck of the femur from long-continued chronic disease, still more, do I think, was the unusual shortening owing to the peculiar nature of the recent injury, and to the action of muscles.

The fracture was indeed a comminuted one, and therefore the lower fragment yielded more readily to the action of the elevating powers, represented by the gluteus, the tensor vaginæ femoris, and adductors, all inserted below the seat of fracture; while, on the other hand, those muscles which might resist somewhat the ascent of the lower fragment, namely, the psoas and iliacus, and obturators, were powerless, as they had lost all connexion with the femur.

The *inversion* of the limb (or rather the reason why it was not everted, as it usually is in the extra-capsular fracture) was fairly attributable to the complete detachment from the shaft of the femur of the eight rotators outwards, which the greater and lesser trochanters give "*points d'appui*" or insertion to.

When this patient was first admitted into hospital, he was in a state of exhaustion, and could give us very little information to assist us to form our diagnosis. The elevation of the enlarged trochanter towards the spine of the ilium; the shortening of the whole limb, greater than ordinarily seen in extra-capsular fracture; the inverted position of the foot:

all these, it may be easily imagined, suggested to many the idea, at first sight, that a dislocation on the dorsum ilii had occurred. However, upon extension having been made, much of the deformity was removed, and when the movement of rotation was now communicated, crepitus was produced, and the limb could be (although with pain) everted to a degree incompatible with the idea of there being any dislocation on the dorsum ilii. When drawn down, however, to the utmost, the limb was still more than an inch shorter than the other. This shortening of the limb, which could not be made to disappear, and the enlargement of the trochanter, were, as the history of the case informed us, really the result of this chronic rheumatic disease, with which the patient had been for many years previously afflicted.

I have never yet heard of a dislocation of the hip-joint having occurred in a person who had been previously affected with this chronic rheumatic disease, nor of the latter having ever come on as a sequel of a dislocation; but the possibility of occurrences such as these should be borne in mind, because we have sufficient evidences of a similar combination of circumstances having obscured the diagnosis of certain injuries and diseases which have been met with in the shoulder, the kindred joint in the upper, analogous to the hip, in the lower extremity.

ANATOMICAL CHARACTERS.

In the first part of this work, when referring to those by whose exertions we have been made acquainted with the pathological anatomy of this disease as it effects the bones of the hip-joint, I have adduced the name of Edw. Sandifort of Leyden, as the earliest contributor to our knowledge on this subject. He, in the second volume of the "Museum Anatomicum," published in 1793, has given delineations of some diseased bones of the hip-joint preserved in the celebrated Museum at Leyden. In the description accompanying them, he has not given any name to the disease. We find, however, in the continuation of the "Museum Anatomicum," vol. iv. (1843), that drawings and descriptions of a similar condition of the bones of the hip-joint are introduced by Sandifort, Jun., who refers the morbid appearances, so graphically delineated in both volumes, to *rheumatic disease*.*

I shall frequently, in this chapter, refer to these specimens and engravings of them, because I consider them by far the most valuable examples extant of the alterations produced on the bones of the hip-joint by chronic rheumatic arthritis; and that this is the disease with which these bones had been affected, I cannot, for my part, for one moment doubt, because, during the whole period of my professional life, I have been conversant with the morbid appear-

* Vol. iv. p. 38.

ances this disease impresses on the bony textures; and have, at Leyden, in 1847, personally examined the preparations in question, and compared them with the excellent delineations of them in the "Museum Anatomicum." Indeed, I would add, that in these delineations, which are very numerous, amounting to at least thirty figures as large as nature, are comprehended almost every variety of organic change, as yet known, that chronic rheumatic disease produces on the *bones* of the hip-joint. It is to be regretted that nothing is mentioned as to the condition of any of the other structures which entered into the composition of these diseased articulations, except the bones, and nothing seems to have been known of the previous history of any of the cases. The sex of the individuals in whose bodies the specimens have been found alone is given.

The anatomical characters of chronic rheumatic arthritis, as it affects the hip, are very well defined. The *muscles* around the joint are usually of a pale colour, and are by no means so well developed as those of the opposite and sound side, with which (in the *local* form of the disease, at least) we have opportunities of comparing them.

The *fibrous capsule* is much thickened, and of a structure so dense as almost to resemble intervertebral substance, and sometimes plates of bone are deposited in its substance; and indeed I find one instance delineated by E. Sandifort, in which the capsular ligament was almost altogether converted into bone: "Videtur, ferme tota capsula articularis ossifi-

eata.”* When the capsular ligament in ordinary cases of this disease is cut through, it is found to contain but a very small quantity of synovia, and what remains of the synovial membrane is usually of a red colour. The reflection of it which lines the interior of the capsular ligament is found to be preternaturally vascular, and is sometimes covered with a layer of lymph.

In many cases the synovial membrane, where it embraces the neck of the femur, is furnished with vascular fimbriæ of a conical form, about one line in breadth at their basis, and varying in length from one half of an inch to an inch.

In such cases the corona of the head of the bone is absorbed in different points of its circumference, and the small excavations or foveæ are filled up by highly developed red vascular fimbriæ (see Atlas, Plate VII. Fig. 2).

Under the influence of this disease the cotyloid ligament is removed, and the short fibrous bands which stretch across the notch in the acetabulum are converted into bone, leaving beneath the arch thus formed, except very rarely, a small space for the passage of bloodvessels into the interior of the joint.

ACETABULUM.

In advanced cases no traces of the ligamentum teres, nor of the mass called Haversian gland, exist in the acetabulum. These, together with the carti-

* Vol. II. p. 76, Plate LXXIV. Fig. 1.

lages of incrustation which line this articular cavity, are altogether removed, as well as the compact layer of bone which these structures had covered; the cells of the bone, thus exposed, yield to weight and pressure, and become so deeply worn away, that the Haversian fossa is effaced, and the acetabulum becomes converted into a deep excavation, capable of containing the enlarged head of the femur.

When, under these circumstances, we examine the concave surface of the acetabulum in the state we usually find it in museums, we observe the dry bone has a worn and porous appearance; and in some places, where the attrition and pressure have been greatest, from the head of the femur, instead of this rough, porous appearance above alluded to, a dense enamel has been formed, and here the surface presents the polish and hardness of ivory. In a few instances I have found the cavity of the acetabulum rendered uniform, not by wearing away of its walls down to the level of the fundus of the Haversian fossa, but by the formation of a plate or lamina of bone which stretched across from one margin of the fossa to the other.* The acetabulum usually has the appearance of having ascended somewhat on the outside of the os innominatum; to be larger and deeper than natural; and to have its brim beset with bony nodules and asperities. A specimen may be seen contained in the Museum at Leyden, which will be

* The Sandiforts are the only observers who have noticed this formation, which is, however, by no means uncommon. Vol. II. Plate cxx. Fig. 1.; vol. IV. Plate CLIV. Fig. 1.

found to be two inches and a half deep, very broad, and having a sharp and prominent margin, from the posterior part of which is produced downwards and backwards an exostotic growth nearly an inch long, and about the size of the extremity of the little finger; smaller stalaetic growths are seen also in this specimen to pass from the inner margin of the acetabulum towards the foramen ovale.

The brim of the acetabulum is sometimes so much contracted by osseous growths, that, although the head of the femur is capable of being moved about in many directions, it cannot by any means be removed from it. In the language of Sandifort, applied to one of his specimens: "Caput ossis femoris, licet quaquaversum mobile, tamen nulla ratione ab eo liberari queat."*

On the other hand we frequently find that the acetabulum, although much enlarged, may be shallower than natural, and of an oval form.

HEAD AND NECK OF THE FEMUR.

The direction of the long axis of the neck of the femur in the normal state is from below upwards and inwards, as well as somewhat forwards; whereas the direction of this axis becomes much altered by this disease; for, from its effects the long axis of the neck will be found to pass inwards at right angles with the direction of the shaft of the bone, as well as some-

* *Loc. cit.*, vol. II. Tab. lxxii. p. 74.

what backwards, and the length of the neck will be diminished, particularly posteriorly.

As from all these causes the highest point of the head of the femur is frequently found below the level of the summit of the great trochanter, and the posterior margin of the corona of the head approximates so much to the posterior inter-trochanteric line, we see sufficient in such organic changes of the neck of the bone to account for the permanent shortening and eversion of the affected limb, which we always notice in these advanced cases.

Sometimes, although the neck of the femur is not really shorter than natural, yet the surface for articulation of the head of the bone with the acetabulum is much increased, at the expense of the surface of the neck all round. The corona of the head in these cases seems to have been added to, by a broad and flat ring of bone, encircling, and at the same time encroaching on the cervix, properly so called. It is to such cases Professor Smith alludes when he says: "Sometimes the neck of the femur retains nearly its natural length, and yet only a small portion of it is visible when the capsule is removed;" and of which Mr. B. Bell speaks, when he observes "that the neck of the femur appears to be as it were encased in a sheath of osseous matter."

Sandifort also describes a specimen of this kind as follows: "The cartilaginous incrustation which ordinarily covers but the head of the femur had, in this instance, descended so remarkably low down on

the cervix femoris, so that the articular part of the surface of the head had become thereby much more extensive than usual.”*

HEAD OF THE FEMUR.—As under the influence of this disease the acetabulum has been found to have undergone various modifications of shape, so also may we expect to find that the head of the femur shall have assumed a corresponding variety of form.

The removal of the cartilaginous incrustation and compact structure of bone, as well as the substitution, for these, of a dense enamel, are processes which mark the effects of this disease on the concavity of the acetabulum; so also shall we find from similar causes analogous effects produced on the convex surface of the head of the femur, where subjected to pressure and attrition; such effects are most conspicuous on the upper surface of the head of the femur where it supports the acetabulum in standing and progression.

The round ligament, as already mentioned in advanced cases, is generally removed from the bottom of the acetabulum, and the extremity of it which is normally attached to the head of the femur no longer exists. Indeed, very usually all traces of the pit, or dimple-like depression for it, in the head of the femur are effaced, and the place it had occupied is sometimes smooth, and even eburnated.

When we examine the head of the femur in advanced cases of this disease, we generally find that it

* E. Sandifort, *loc. cit.*, vol. II. p. 74.

has quite lost its normal form; that it is usually very much enlarged and flattened, as it were, from pressure exerted on it from above downwards.*



FIG. 3.

Effects of long-continued chronic rheumatic arthritis of the hip on the neck and head of the femur.

Or, to use the language of Mr. B. Bell: "It looks as if the head of the bone were forced downwards by the action of some great pressure; and I have seen cases in which the interstitial absorption of the neck had proceeded so far that the head of the bone rested upon the upper part of the trochanter minor."[†]

We may here observe, that in parts of the head of the femur which are not covered with the ivory enamel so often alluded to, the surface of the head

* See also Atlas, Plate VII. Fig. 4.

† Bell on Diseases of the Bones, p. 93.

presents a *porous* appearance, as if it were drilled with an infinite number of small foramina. These in the dry state of the bone are seen to penetrate to a considerable depth; but I would here remark, that although these pores have attracted much observation from anatomists, they are only to be seen in the dry bone. In the examination of *recent* specimens of this disease, I have found that the pores in the head of the femur were filled up with a very red cellular tissue. In my anatomical examinations of the hip-joint of individuals who had been affected by this peculiar disease, and with the previous history of whose cases I had been acquainted, I have observed, that if the hip-joint had enjoyed *motion*, although the pores were thus filled up by this red vascular structure, none of it was to be found projecting beyond the level of the articular surface of the head of the bone; but, on the other hand, in our anatomical examinations of cases in which *no motion* whatever had existed of the articular surfaces of the hip on each other, a fine vascular cellular tissue was found not only to fill up these pores, but to project out from them, and to form a fine, continuous vascular membrane, which invested the articular surface of the head of the femur and interior of the acetabulum. On pursuing further our anatomical investigations in these last-mentioned cases, we have observed, that beneath this vascular layer just alluded to as covering the head of the femur, no cartilage of incrustation existed; and when the bones had been macerated, we have noticed that

the articular surfaces have presented the usual porous appearance, but as there had not been any motion in the hip-joint, no eburnation was observable.*

When the head of the femur has assumed, as the result of this disease, an oval form, its circumference often presents a rough and nodulated margin, and the asperities on the head may be found to correspond to notches in the margin of the acetabulum. The eminences and depressions in each bone are seen confronted and adapted to each other; and from such a state of things we naturally may infer that little motion had existed in the joint. Yet in these cases a degree of eburnation of the articular surfaces is usually seen.

Among the varieties of form the head of the femur assumes as the result of this disease, we should also mention that it has been found of a globular figure, and at the same time to be greatly enlarged, and very heavy. One of these cases Sandifort has described in the following words:—“*Superficies articularis capitis ossis femoris, globosæ figuræ, magnitudinis valde auctæ, partim porosa, partim polita,*” and thus concludes:—“*Hoc os ponderosum est.*” †

Although in the preceding pages I have frequently had to observe, that enlargement of the head of the femur was one of the most constant of the abnormal conditions to be noticed as the consequence of this disease, and that in general it affected only one of the hip-joints in the same individual, I must,

* See Index, reference to case of Patrick Haekett.

† *Loc. cit.*, vol. IV. Tab. XXVII.

however, here remark, that exceptions to these rules may occasionally be found to exist, particularly in cases in which the disease had assumed the constitutional form.

Professor Smith, for example, has called attention to a specimen contained in the Museum of the College of Surgeons, Dublin. The preparation consists of the pelvis and thigh bones of a female, aged 60.

“The heads of both femora (although presenting some of the characteristic appearances of the result of chronic rheumatic arthritis) are *diminished* in size ; that of the right is slightly elongated. The surface exhibits a very trifling degree of enamelling, and is, as it were, drilled with an infinite number of small foramina, many of which penetrate to a considerable depth. The acetabula are equally porous, and out of all proportion *larger* than the heads of the thigh bone. The increase in size is partly effected by osseous additions to their free margins, and partly by a protrusion of their inner walls into the cavity of the pelvis, where they form two hemispherical bulgings, which diminish the transverse measurement of the pelvis by at least one inch. The bone in this situation is exceedingly thin, and quite diaphanous. It is remarkable, that in the joint of the left side the ligamentum teres was present, in a very strong and perfect state, the synovial portion being alone deficient. The absence of porcellaneous deposit on the opposed surfaces of this side may be, perhaps, accounted for by the fact of the patient having been for years confined to bed, during which time, conse-

quently, there was little or no friction between them."*

The foregoing must be considered to be a very unusual specimen of this disease. The history of the case was unknown, but, from the circumstance of both hip-joints having been similarly affected, it appears to me almost certain that it was the constitutional form of the chronic disease that the woman from whom this specimen was taken had laboured under.

It may be collected from the preceding account of this disease, as it affects the hip-joint, that the sub-inflammatory action of the osseous structures of the joint which exists causes for a time softening of them ; and, under such circumstances, these will naturally yield to the influence of the superincumbent weight of the body, and thus would physiologists account for the characteristic shortening and depression of the head and neck of the femur, the gradual extension upwards of the acetabulum on the outside of the os innominatum, all which have been observed as the ordinary effects of this disease. Such are the opinions the younger Sandifort takes the opportunity of expressing on the occasion of his giving a description of some engravings he has introduced into the fourth volume of the "Museum Anatomicum," which exhibit the ordinary anatomical characters of this disease as it affects the bones of the hip-joint. "In these plates are exhibited," says Sandifort, "the de-

* Dr. Houston's Catalogue of the Museum of the College of Surgeons in Ireland, vol. I. p. 379.

generation the hip-joint undergoes from rheumatic disease, which first softens, and causes an expansion of the bones. These, in the course of time, afterwards attain a remarkable degree of solidity by the re-introduction of fresh and increased deposits of phosphate of lime."*

Thus, according to Sandifort, during the period that the bony articular particles are in the softened condition, they become unequal to bear the superincumbent weight of the trunk ; hence this last *descends*, as it were between the femora, and the acetabula ascend.

The remarkable ease lately alluded to, in which the acetabula formed two hemispherical bulgings into the cavity of the pelvis, would also, according to this theory, be explained by assigning the bulging inwards to the influence of the superincumbent weight of the body, causing a yielding of the fundus of the acetabulum at a time when this portion of the bony tissue of the hip-joint was in the softened condition alluded to by Sandifort. The shortened state of the neck of the femur on its posterior aspect so usually observed as the result of the disease we are here considering might also, according to the same theory, be attributed to the predominant influence of the numerous rotators outwards acting on the neck of the femur, at a time when this portion of the bone was in the yielding state alluded to. Such explanations are ingenious, but, in my opinion, cannot be

* *Loc. cit.*, vol. IV., p. 38. 1835.

admitted as capable of universal application ; for in some rare cases of this disease it has been found that the head of the femur, instead of being depressed below the level of the great trochanter, has, on the contrary, been found to have reared its head and neck upwards above the summit of this process, and, therefore, in a direction quite the reverse of that which the superincumbent weight of the body should naturally have given to it.

Although it cannot be denied that *physical* causes under the circumstances mentioned may be fairly referred to, as *modifying* many of the deviations from the normal form we notice the bones of the hip-joint to present, when affected by this disease, still we cannot but remark, that in the contemplation of the morbid results there is at the same time sufficient to satisfy us that a very active *vital* process is going on in the interior of the bones, as well as in all the structures around the diseased joint, which may be supposed principally to influence all these deviations from the normal state of the articular textures. The thickening of the fibrous capsule, and hyperemic state of the synovial structures ; the exuberant growth of bone which we see around, deepening the acetabulum, or surrounding its brim with bony nodules ; the enlargement of the head of the femur to the degree that this head shall assume an oval, convex surface, measuring in circumference ten inches and a half, as in the specimen from which the drawing (Fig. 3, p. 81) was taken,—all these are sufficient proofs that besides the interstitial absorption and consequent

shortening going on in the interior of the cervix femoris in these cases, a very active condition of the minute arteries exists externally, giving birth to those exostotic deposits which encircle the head, and which spring from the neck of the femur.

Although the state of the articular surfaces of the bones themselves, stripped of all their coverings, has been well described by anatomists, and delineated, it would appear to me that the *recent* appearances of all the structures of the joint which had been affected with chronic rheumatic arthritis have not hitherto attracted as much attention as they should have received; and here, perhaps, I may be permitted to refer to a communication which I made to the Pathological Society of Dublin, January 19, 1839, which was reported as follows:—

CASE IV.

A man, aged 60, had been for a long time under observation in the House of Industry, Dublin, affected with this chronic rheumatic disease of the hip-joint in the *local form*. He died of another disease, and I availed myself of the opportunity thus presented of investigating the anatomical characters of this disease of the hip-joint, and of laying before a meeting of the Society the recent specimen.

I remarked that the hip-joint, viewed externally,

seemed to be altogether greatly enlarged,* and that the acetabulum and head of the femur were each surrounded by an exuberant growth of bone, so that the thigh could be neither fully extended nor abducted,† and rotation was impracticable; whenever any movement was communicated to the joint, even at the moment of making the post-mortem examination, a well-marked crepitus was perceptible.

The pelvis seemed somewhat distorted in consequence of the weight of the body having been so long thrown on the opposite and sound limb in walking, and also from the elevation of the affected hip-joint. The spinous process and crest of the ilium of this side were very much incurvated, so as to present much the same appearance as these processes do in ordinary cases of caries of the hip-joint of long standing, or as they do in the case of congenital malformation of this articulation. The muscles were all of a yellowish hue; the capsular ligament was greatly thickened, and of a structure like to intervertebral substance. When the joint was opened a very small quantity of viscid synovial fluid escaped. The acetabulum was much excavated, and at the same time deepened by a rising brim of apparently *new growth*; a cartilaginous body, the size of a small

* This disease, as it affects the hip-joint in man, bears many points of resemblance to the disease of the hock-joint in the horse, called spavin. There is an analogy between them, not only in the enlargement of the joint and eburnation of the articular surfaces, but also in the symptoms and the species of lameness which is observable in both.

nut,* was found *loose* in the interior of the joint. The bottom of the acetabulum was fully two inches distant from the brim; the cartilage and Haversian gland had disappeared. The head of the femur and the acetabulum presented the usual anatomical characters of this disease; they were covered with porcelain-like deposit.

It has been remarked, that as a consequence of this disease, the head of the bone is sometimes enormously enlarged, and the acetabulum shallow; and that in other cases, on the contrary, the acetabulum forms a true deep cup, which so closely embraces the head of the femur that it is with difficulty extracted from it. The latter was the case in this instance. I here took occasion to observe, that I wished to draw the attention of the Society to the state of the vascular system of the surface and interior of the bones, as well as of the synovial system, to be observed in these cases, as these interesting points had not been hitherto attended to. I observed that, when we looked into the interior of the acetabulum, it was seen to present a bright red colour, owing to the increased vascularity of the bony tissue, for the cartilage of incrustation had been removed. The head of the femur was much depressed, somewhat enlarged, and presented a blunt conoidal form (see Atlas, Plate VII., Fig. 2).

* The following remark, which I copy from the "Archives Generales de Médecine" (tom. XII. 1846; par Dr. J. M. Blonden), shows us that the details of such cases as the foregoing are not useless:—"l'Articulation de la hanche est jusqu' ici la seule ou l'on n'ait pas trouvé ces corps étrangers."—Page 363.

The basis of the head had approximated within a quarter of an inch of the inter-trochanteric lines; much of the surface of the head was eburnated even where the fossa or dimple for the round ligament had existed.

The rest of the surface of the enlarged head presented a pink colour; this blush was deepened in several parts by the surface being interspersed with small red dots or spots: these, when closely examined, are found to correspond to small pores in the head of the bone. And here let me delay a moment to remark, that these are the *pores* which are concealed from view by the red cellular tissue with which they are filled up in recent specimens of this disease, but which constitute one of the anatomical characters of it in the dry bone, with which we are so familiar.

The corona of the head, when examined posteriorly, seemed undermined, as it were, and excavated in parts; and here a highly vascular fibro-cellular tissue appeared to be formed into tufts and villous processes, which occupied foveæ or depressions in the back part of the neck of the femur, and were here lodged under the shelter, as it were, of the projecting corona of the head, thus protected from pressure and attrition during the movements of the articular surfaces.

When we examined the loose folds of synovial membrane which invested the inferior part of the cervix femoris, they also were found to be of a bright scarlet colour, and conical-shaped vascular

fimbriæ were observed growing from the synovial membrane of this portion of the neck of the bone. These, both in form and size, resembled somewhat the elongated papillæ found in the inside of the mouth and tongue of herbivorous quadrupeds, except that their fimbriæ were soft, had a villous surface, and were of an intensely red colour.* This, I remarked, was the second case I had met within these few months, in which these productions from the synovial membrane of the neck of the femur had existed, and they seemed to me to be specially the effect of chronic rheumatic disease.

CASE V.

With a view to illustrate this disease further, I may refer to a communication made by the late Dr. Colles to the Pathological Society of Dublin, of a very well-marked case of this chronic disease of the hip. The case was that of the late Dr. Percival, who died of disease of the bladder, aged 82 years. He left directions with his family that a post-mortem examination should be made of his body, and that the result should be laid before the Pathological Society. Accordingly, at the meeting held in Trinity College on the 23rd March, 1839, Dr. Colles made the following communication. He said he wished to lay before the meeting that day the history of the case of a gentleman lately deceased, with whom many of those there assembled had been for

* See Coloured Drawing, Richmond Hospital Museum, No. 158.

years well acquainted. The gentleman he alluded to was the late Dr. Percival, one of the most distinguished physicians of his day. Although Dr. Percival had attained the age of 82 years, he had experienced for many years of his life most severe sufferings; some of these latterly arose from an organic disease of the bladder, of which he died; but for twenty years previously to the date of his decease he was afflicted with that chronic disease called morbus coxæ senilis. He had had this painful affection latterly in both hip-joints.

So far back as the year 1818 Dr. Percival first complained of pains in his hands, which he considered to be of a mixed nature, partaking somewhat of gout and rheumatism.* These pains occasionally interfered with his ability to write his prescriptions, for which purpose he sometimes made use of any friend in consultation with him. Subsequently to the attack of these severe pains in the hands and wrist-joints, which were at times accompanied with considerable swelling, that is to say, about the latter end of the year 1820, he began to complain of pain in his right hip-joint. This he at first disregarded; but at length he applied a blister behind the trochanter, and determined to give himself for a day

* To show the difficulty Dr. Percival himself experienced in giving a special name to his disease, I may mention,—I have it from Dr. Cheyne,—that to an unprofessional friend, who casually asked him whether it was gout or rheumatism with which he was affected, he replied, in his well-known characteristic manner:—"I do not look upon my complaint, strictly speaking, to be either gout or rheumatism, but I consider it to be *the spurious progeny of both.*"

or two some rest from his professional business. But from this application, and its consequences, he was confined to the house for a fortnight. The disease gradually became more troublesome, and interfered much with his power to go through the extensive professional duties he was called upon to perform, he being unable to walk without the assistance of a stick, and subsequently of a crutch.

Latterly, Dr. Percival could not prevent his right leg from crossing over the left; in this position he found ease from suffering, and to remove the limb from it gave him considerable pain. When he sat in this attitude he felt tolerably free from uneasiness, and he could gradually raise himself nearly to the erect posture, without much suffering, provided he did so slowly, cautiously moving the pelvis on the head of the femur. These slow and cautious movements from the sitting to the erect posture did not give pain, and he frequently called the attention of his medical attendant to the very loud crackling noises they occasioned. He had all the ordinary rational signs of the disease, the shortening and eversion of the limb, and the characteristic walk. There was considerable difference between the date of the right hip-joint having become affected, and that of the left, which was not implicated in the same diseased action until the year 1834.

The appearances of the joint as exhibited by Dr. Colles were quite characteristic of the disease: there was the usual flattening of the heads of the bones, the ivory deposit replacing the absorbed cartilage;

a similar deposit on the acetabulum ; total absence of the ligamentum teres ; shortening of the neck of the femur ; and osseous depositions in various situations. One of these lay in front of the right acetabulum, and the anterior crural nerve, flattened and redder than natural, passed over it ; this appeared to Dr. Colles to explain the great amount of suffering experienced by Dr. Percival during the latter part of his life ; he could not prevent the right limb from crossing over the left, &c. &c. The right limb was shorter than the left. Upon removing the left femur from the socket, the head of the bone was found intensely red and vascular, and a number of small pieces of bone were found connected with the capsule ; there were *none loose* in the joint, as was supposed from the very peculiar grating or rattling sound heard during life, whenever the limb was moved ; both thigh bones were found to be remarkably heavy and dense.

Dr. Colles in his observations on this case remarked, that both hip-joints were affected, a circumstance in his experience rarely noticed in this disease. Another circumstance he wished to draw attention to was, that this disease was usually observed to affect the hip-joint in those who belong to the labouring classes ; and, he added, indeed so much so that by many it was supposed to be the result of bodily fatigue, exposure to wet, and over-exertion. These causes, however, could have had no influence in the development of the disease of the hip in this case, because, even in his youth, Dr. Percival never had indulged in violent or active exercise, and it

might be truly said of him, scarcely any man had walked less. Nor could it be said to arise from rheumatism, for there was no sign of rheumatism in any other part of the body. Was it, then, from gout? Dr. Colles did not think it was; he had disease of the hip-joint, but this was a disease which he had not observed in gouty persons.

The only remaining observation Dr. Colles said in conclusion he had to make was, that the femoral artery, where it passed over the forepart of the acetabulum, was very much ossified.

CHAPTER II.

THE DISEASE IN THE SHOULDER.

THE shoulder-joint in the upper is analogous to the hip-joint in the lower extremity. Bichat considers these two articulations physiologically together, and makes them constitute his first class or primary division of the joints.* So may we be permitted to contemplate them together pathologically. Indeed, as there are many and peculiar points of resemblance in the symptoms and anatomical characters of this chronic disease, as it affects the hip and shoulder-joints, I think I may next pass advantageously to the consideration of it in the latter before I proceed to describe it in any of the other articulations.

CAUSES AND SYMPTOMS.

The commencement of this disease in the shoulder is frequently attributed by the patient to an accident,

* “Les articulations scapulo-humerales et ileo femorales en sont des exemples, elles le composent presque exclusivement.”—Bichat, *Anat. Generale*, tom. II. page 179.

such, for example, as a fall on the shoulder, or to a sprain of the joint, and in these cases the consequent disease has usually appeared quite as a local affection: more frequently this chronic complaint would seem to have a constitutional origin, having sprung out of the remains of rheumatic fever, and in such cases both shoulder-joints, as well as many of the other articulations, will be found to be symmetrically engaged.

The patient complains of feeling pains in the shoulder-joint, which, like those of rheumatism, are variable, and seem to be under the influence of changes in the atmosphere. He states that he feels a stiffness in the joint, and is conscious of a crackling sensation in it, particularly when he first moves it in the morning. In the very early stages of the disease a fluctuation of fluid is sometimes perceptible through the soft parts which cover the articulation anteriorly. This fluid after a time becomes absorbed, and then the shoulder presents a wasted appearance; the prominences formed by the bony processes around the joint become conspicuous. The head of the humerus is generally observed to be a little elevated, advanced, and somewhat approximated towards the median line. When we view the articulation in profile (if we may so say), the amount of the advancement of the head of the humerus is more readily appreciated, and when we look at the joint from behind, a very remarkable abnormal depression is noticed, corresponding to the space which exists between the posterior edge of the glenoid cavity and the head of the humerus.

If the disease be of the *local* form, and only one shoulder-joint be affected, these appearances become the more remarkable when we compare with each other the morbid and the sound articulation. As the disease proceeds, the voluntary motions of the joint become restricted within very narrow limits; the patient can abduct the elbow to the extent of a few inches from his side, but cannot elevate the arm nearly to an horizontal level. The motions he is capable of performing are chiefly confined to what are called by the patient underhand movements, yet the head of the humerus is under some circumstances susceptible of an abnormal degree of mobility. For example, although the summit of the humerus may be found (in the ordinary form of this disease) to be placed above its normal level, and to be situated several lines higher (see Atlas, Plate x. Fig. 7, A) than the coracoid process; still, if the arm be grasped by the surgeon, it can be drawn down, and the head of the bone may be momentarily placed beneath the coracoid process. The shoulder will then assume all the appearances usually assigned as the marks of the case styled by Sir A. Cooper "*partial luxation of the head of the humerus forwards and inwards.*" Sometimes adhesions may have occurred, which retain the humerus upwards towards* the acromion, and prevent these movements: on the other hand, partial luxations may take place in other directions besides that above alluded to, as we shall just now have occasion to show.

* See Maily's case.

DIAGNOSIS.

It has been already stated that chronic rheumatic arthritis may appear in the shoulder as a symptom of a general constitutional disease, or it may assume quite the form of a local affection. In the former, the history of the case, the general rheumatic pains the patient reports himself to suffer from, as well as the symmetrical nature of the affection, all declare the case to be one of chronic rheumatic disease which cannot well be confounded with any other.

In the local form of chronic rheumatic arthritis of the shoulder, only one articulation is affected, as is the case in articular caries of the bones which form the joint. In both these last-mentioned cases crepitus is elicited on moving the articular surfaces on each other; but the efforts to produce crepitus, and the pressing together of the articular surfaces, cause, in the case of articular caries, so much pain, that the patient shrinks back from our attempts at making these trials; while, in the ordinary case of chronic rheumatic arthritis of the shoulder of the local form, we find we can press the head of the humerus firmly against the glenoid cavity without giving any pain to the patient, just as we can, in the case of the same disease when it affects the hip-joint, press the head of the femur against the acetabulum without causing the least uneasiness to the patient. There is more pain, more wasting of the muscles of the arm and forearm, and more sympathetic disturbance of the constitution, in the case of articular caries, than in that

of chronic rheumatic arthritis; and while the former proceeds either to suppuration or to ankylosis, these, we may say, never occur in the latter.

ANATOMICAL CHARACTERS OF CHRONIC RHEUMATIC
ARTHRITIS OF THE SHOULDER.

When we anatomically examine the shoulder-joint of a patient who had long laboured under this chronic disease in this articulation, we notice, on removing the integuments, that the deltoid is unusually pale, and that the interstices between its fibres are occupied by an unhealthy-looking fat. This muscle, and the subjacent capsular muscles, are in a state of atrophy. The capsular ligament is generally altered in form and structure, and this sac will sometimes be found to have abnormal attachments to the acromion or coracoid process (see Atlas, Plates II. and III.), while its union to the anatomical neck of the humerus has been occasionally found to be interrupted, allowing of an opening through which the head of this bone can pass (see Atlas, Plate x. Fig. 5, A). The capsular ligament is usually increased in thickness; its fibres are hypertrophied; and even osseous particles have been found in its substance.

On the other hand, it has occasionally proved on examination to be attenuated as to its structure, and even reduced to synovial membrane merely. In some examples this capsule is observed to be very capacious, as if it had never recovered the over-disten-

tion it had suffered in the early stage of the disease; the subdeltoid bursa occasionally freely communicates with the general cavity of the joint.

When *the interior* of the capsular ligament is examined, it will be found to bear evidence of having been the seat of chronic inflammation. Bunches of long, organized fimbriæ hang into the interior of the synovial sac, and many of these vascular fringes, which in the recent state are of an extremely red colour, are seen to surround the corona of the head of the humerus.

We also notice rounded cartilaginous productions appended by means of membranous threads to the free surface, internally, of the various structures which compose the joint. Some of these "foreign bodies" are small; others large; some are round (see Plates II. and III.) Indeed their shapes are various: one of these bodies I have seen an inch and a half long, of a crescentic form, its cornua embracing horizontally the neck of the humerus, to which it was attached by means of two short membranous pedicles, the prolongation of the cornua above mentioned (Atlas, Plate II. *g*).

Besides these cartilaginous "foreign bodies," also called "pendulous bodies," we occasionally find, as the result of the disease we are adverting to, bony bodies of an irregular form, added to the edges of the glenoid cavity, deepening it and increasing the articular surface for the reception of the head of the humerus, which is usually in such cases much enlarged. These bony bodies are of the class I have

ventured to name additamentary bones (see Atlas, Plate IX. Fig. 7, D).

TENDONS.—Should we have an opportunity of examining the anatomical condition of the tendons in and immediately around the shoulder-joint in any case in which the disease had existed in an early stage, we shall find that these structures resemble tendons which had been for a long time macerated, and that they have their fibres widely separated from each other, as it were about to resolve themselves into their primitive elements. We have preparations in the Richmond Hospital Museum showing this commencing state of disintegration of the tendons of the capsular muscles.

The tendinous insertions of the subscapular, supra, and infraspinatus, and teres minor muscles, are sometimes found detached from the tubercles of the humerus.

As to the tendon of the biceps, except in those cases in which an opportunity is afforded to us of examining a shoulder-joint in which this disease is in an early stage, we usually observe that the whole of the intra-articular portion of it has been removed. The remains of the portion of this tendon of the biceps external to the capsule will be found to have contracted firm adhesions to the summit and edges of the bicipital groove.

In some very rare cases this tendon has been found flattened and spread out, though still preserving its ordinary position in the synovial cavity.

In other examples this tendon may be seen to be thrown off the summit of the humerus, and to lie

internal to it, as I shall just now have occasion to show.*

BONES.—The head of the humerus is generally much enlarged; it assumes appearances the consequences of this peculiar disease, and acquires characteristic forms, which cannot be easily mistaken for the effects of any other disease or accident.

Sometimes the surface for articulation with the glenoid cavity will be found to occupy the lateral part of the head, leaving the tuberosities and anato-

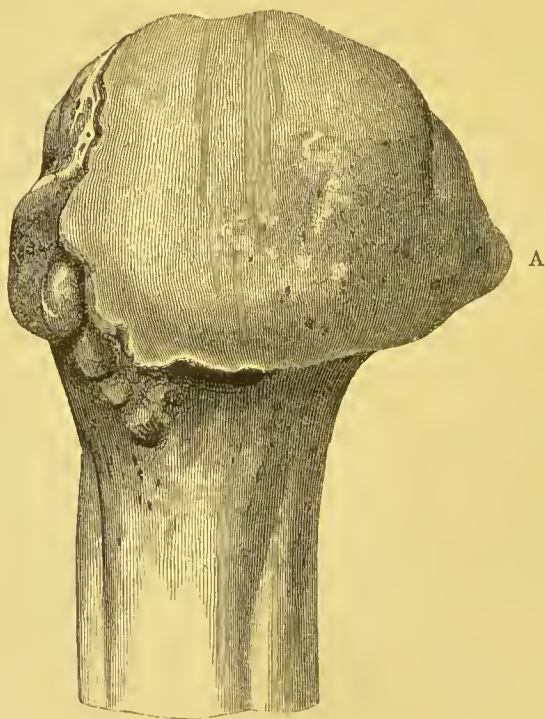


FIG. 4.

P. DONOGHUE'S CASE.—Right humerus, anterior view; the articular surface much everted.

* See Maily's case.

mical neck of the bone free, presenting as to its articular surface an ovoidal outline, the narrowest part A (see woodcut, Fig. 4), being placed posteriorly towards the axilla.

In many instances the whole summit of the humerus, together with the upper part of the greater and lesser tubercle, and highest part of the bicipital groove, are included in the articular surface. The semicircular sulcus which marks superiorly the anatomical neck of the bone and insertion of the capsular ligament is effaced; some of the articular cartilage, we find, has been removed from the head of the bone, which in some places presents a porous appearance. In other parts, in place of the cartilage, there is a polished ivory-like surface. The portion of the bone which thus presents this polished surface is the very summit of the humerus, and this is the part which will be found evidently to have been for years in habitual contact with the under surface of the acromion and coracoid process, where these bones assist in forming portions of the new and abnormal cavity for the reception of the head of the humerus. The basis of the head, in the line where it joins the shaft of the humerus, is studded round by granular osseous productions, which give to it a characteristic appearance (see Atlas, Plate III. Fig. 3, B, B). By these vegetations of bone we are reminded of the analogous appearance which the corona of the head of the femur presents when affected by the same species of morbid action.

Lastly, we have to advert to the anatomical characters of the new and abnormal socket formed for the reception of the altered head of the humerus.

This new cavity is composed of two portions, which, however, will be found to have become almost continuous with each other. The original glenoid cavity (generally much enlarged) forms one of these portions; the coraco-acromial vault the other. By the coraco-acromial vault we mean a concave surface, looking downwards, formed internally by the coracoid process, and externally by the acromion; the intervening space being filled up in front by the proper triangular ligament of the scapula, and completed behind by a portion of the under surface of the acromial end of the clavicle (see Atlas, Plate III. Fig. 2, A, B, E). This coraco-acromial arch overhangs much the head of the humerus, and its inferior surface in the normal state is not articular, but, on the contrary, is separated from the head of the humerus, which is beneath it, by an interval of about three or four lines, measured in vertical height. This interval is normally occupied by the long tendon of the biceps and a portion of the capsular ligament passing from the upper margin of the glenoid cavity to the humerus, the capsular ligament having above it the tendon of the supraspinatus; the subdeltoid bursa, much cellular tissue, and the fibrous bands which pass from the coracoid and acromion processes to the humerus.

Under the influence of the most usual form of this disease, all these parts normally intervening between the head of the humerus and the coraco-acromial arch, or vault, are absorbed, and the superior extremity of the head of this bone comes into contact with the concavity of the arch, without the intervention of any structure whatsoever, so that the head is constantly pressed against the under surface or concavity of the coraco-acromial arch; and not only do the processes of the scapula, which form this arch, show manifestly the effects of attrition, but the outer portion of the acromial end of the *clavicule* does so equally (see Atlas, Plate II. A, and Plate III. Fig. 2, A)

All these portions of bone are rendered concave by pressure from below, and are usually covered by a porcelain-like deposit, corresponding to an analogous polished surface which covers the convexity of the summit of the humerus.

ACROMION.—In many cases in which the shoulder-joint has long been the seat of this chronic disease, the acromion process has been found traversed in the original line of junction of its epiphysis by a complete interruption of its continuity, *as if fractured*,—I say, *as if fractured*, for I am convinced that this solution of continuity of the acromion process is not really a fracture produced by violence, but a lesion, which so frequently exists in combination with chronic rheumatic arthritis of the shoulder, that I feel compelled to look upon it, in these cases, as a peculiar organic change, the result of chronic rheumatic dis-

ease. I do not pretend to account for the separation of the acromion process into two portions, nor can I say why it is that the division occurs in the original line of junction of the epiphysis, particularly at the late period of life at which we generally witness this phenomenon. Sometimes the solution of continuity in this line is scarcely discoverable without close examination ; as a proof of which I may mention, that I have known one instance of chronic rheumatic disease of the shoulder-joint brought forward by an excellent anatomist, and no mention was made by him of the lesion in question, either when he was publicly alluding to the case, or in the printed account given of it. The specimen, however, on which were grounded his observations was subsequently subjected to a new examination, when a complete solution of continuity in the bony tissue of the acromion process was discovered.

On the other hand, although the acromion process may be found separated into two portions, and the line of division have originally occurred in the usual place, still, these two portions may after a lapse of time be seen widely separated from each other, the fibrous tissue which had closely united them having from some cause become elongated.

Professor Smith agrees in the view that the separation in the cases in question *almost* invariably occurs where in early life the epiphysis joins the remainder of the acromion process ; but still mentions that he has "*in one instance found the entire*

of the acromion separated from the spine of the scapula."*

In *some* of these cases I have found the acromion in a state of hypertrophy, in others, in a state of atrophy, but in no case did there seem to be any attempt at ossific deposition on any of the surfaces of the separated portion of the acromion, a circumstance which might be expected if a fracture really had occurred.

I have so frequently, in making anatomical examinations of the shoulder-joints of those who had been afflicted with this disease, met with this lesion in the acromion process, in the line of junction of the epiphysis with the rest of the scapula, that I have many times expressed my conviction that the lesion was to be attributed to disease alone; but when I published any observations on this matter, I had not the means of adducing the *proof* of the correctness of this conclusion, which can be drawn, I imagine, from the lesion being found to be double, or symmetrical, in the same individual.

This proof I can now supply by referring to a case brought before the Pathological Society of Dublin, by Professor Smith, who exhibited the right and left scapulæ of the same individual, who apparently had long suffered from the effects of this disease in almost all his joints in general, and in his shoulder-joints in particular.

In this case *both acromion processes* had been se-

* Smith on Rheumatic Arthritis of the Shoulder: Dublin Quarterly Journal, May, 1853.

parated from the scapulæ, in their original line of junction of the epiphysis with the rest of the bone. Nothing was known of the previous history of this case, as to whether the patient had at any time met with any accident ; but I think we may safely infer that the double lesion here mentioned was clearly a morbid change, the result of that disease which it is the object of these pages to elucidate.*

I have stated that the bones entering into the formation of the shoulder-joint are very *generally* enlarged, as a consequence of this chronic disease having for a considerable time existed in the articulation. It is right, however, here to observe, that very extensive inquiries into the pathological anatomy of this peculiar affection, as it presents itself in the shoulder, will prove that some exceptions to this rule may be occasionally met with, and that, instead of the bones entering into the formation of the shoulder-joint being found hypertrophied, they may be discovered, on the contrary, to be in a state of atrophy, or portions of these bones may be removed altogether as the apparent result of this chronic rheumatic disease.

That I may not appear to have been singular in having observed the various changes which the acromion process and neighbouring bones have undergone, as the result of this disease, I may refer to the

* Among the specimens hereafter to be alluded to, as adduced by Mr. J. Gregory Smith, there is also noticed the detachment of the extremity of the acromion process from the spine of the scapula on both sides in the same individual : London Medical Gazette, vol. xiv.

account of a dissection of a case given by Cruveilhier, in which the affection, which he describes under another name, but which I have called chronic rheumatic arthritis, was so general in the system of the patient that there was scarcely any articulation in his body found exempted from its effects. When adverting to the anatomical changes observable in the region of the shoulder, in this example, he says: "*The external extremity of the clavicle and the neighbouring part of the acromion were in a great part destroyed,*" &c.

In the Museum of the Dublin College of Surgeons will be found a preparation of a shoulder-joint, which is styled by the late Dr. Houston, in his Catalogue, a specimen of *chronic rheumatic arthritis* of the shoulder; and that it was correctly so styled may be inferred not only from the well-known accuracy of the lamented pathologist, but from the appearances of the joint, which are described in the Catalogue:*—The bunches of synovial fimbriæ hanging into the synovial cavity of the joint; the existence of *hydrops articuli*, or over-distention of the sac by an albuminous fluid; the deficiency of the intra-articular portion of the tendon of the biceps, mentioned in the account given of the case,—all these show the disease to have been rightly designated. I have carefully examined this preparation lately with the intelligent Curator, Mr. Carte, and we ob-

* See preparation in the Museum of the College of Surgeons, Dublin: Catalogue, vol. II. page 397, E. b.

served that the acromial end of the clavicle is unsupported, and that the acromion process has been removed for the amount of an inch in extent; that which remains of it is thinner than natural, and is in a state of atrophy.

CORACOID.—The coracoid process is not usually found so much altered by this peculiar disease in the shoulder as the acromion; but I have found its under concave surface, in some cases, to have become truly articular, or to have entered into the formation of the shoulder-joint, and beneath to have presented a broad glenoid-shaped surface, looking downwards, which had been smoothed off from frequent contact with the head of the humerus; while the breadth of the process had been at the same time much increased (see Atlas, Plate II.)

GLENOID CAVITY.—The glenoid cavity of the scapula, under the influence of this disease, is generally much enlarged; its surface appears preternaturally excavated, its brim being usually elevated into a sharp margin. The glenoid ligament and cartilage of incrustation are removed; some parts of its surface are porous, and some are covered with a porcelain-like enamel. Near to the margin (Plate IX. Fig. 7, D) of this cavity, from which the capsular ligament arises, we often observe osseous productions attached to the capsular ligament, adding depth to the receptacle for the enlarged head of the humerus. In some examples we find that by becoming abnormally wide at its upper part, the glenoid cavity

loses much of its ovoidal figure, and approaches in its outline more to a circular form (Fig. 5).

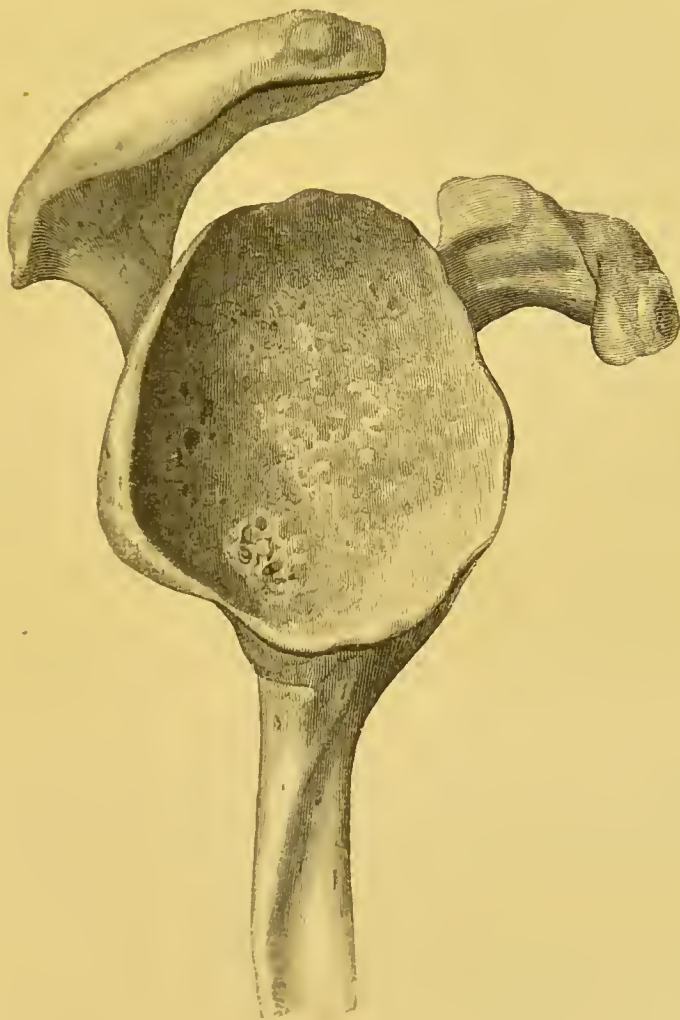


FIG. 5.

P. DONOGHUE'S CASE.—Right scapula and glenoid cavity, with a sharp outline, nearly of a circular character.

Sometimes the head of the humerus occupies its upper portion, and remains habitually in contact

with the under surface of the acromion and coracoid processes, thus leaving the lowest part of the glenoid cavity unoccupied.

On the other hand, it has occurred to me to meet with examples the very reverse of the foregoing, in which the head of the humerus was found to have descended on the axillary margin of the scapula, where an addition had been made to the lower part of the original socket to receive it. And lastly, I shall have to refer to a case in which part of the head of the humerus remained within the glenoid cavity, while another part of it occupied the neighbouring portion of the subscapular fossa. Under all these varied circumstances, the glenoid cavity and head of the humerus shall be found to have assumed appearances likely to be mistaken for the effects of accident, but which I shall endeavour to prove are the result of the disease we are in this place considering.

Those who carefully study the anatomical characters of chronic rheumatic arthritis of the shoulder cannot fail in the course of their investigations to observe many deviations from the normal state of the joint, the result of this disease, which are well calculated to mislead those who are unacquainted with it, to which we may here advantageously advert.

For example, it has been repeatedly remarked, on making the post-mortem examinations of the shoulder-joint of those who had been affected with chronic rheumatic arthritis, that the intra-articular

portion of the long tendon of the biceps was absent from the joint, although adherent outside to the top of the bicipital groove (see Atlas, Plate III. Fig. 3, c). This removal of a portion of the tendon of the biceps strikes the observer who is unacquainted with the ordinary effects of this disease as a direct proof that the tendon had been "*ruptured*" by accidental violence, and that a partial luxation of the head of the humerus has been the consequence.

Another character of this disease is, that the humerus has a very general tendency to pass upwards towards the under surface of the coraco-acromial vault, and besides the removal of the tendon of the biceps, the superior part of the capsular ligament is observed to be deficient (see Atlas, Plate x. Fig. 5). Those who do not know that this perforation is a consequence of slow disease, which has been frequently observed, immediately take it for granted that the same supposed accident which ruptured the tendon of the biceps had also caused the head of the humerus to be partially dislocated upwards, and the superior part of the capsular ligament to be at the same time perforated.

If in addition to these abnormal appearances small portions of bone, as if fragments broken off from the margin of the glenoid cavity, are found to be present, as they frequently are (see Plate III. Fig. 1, and Plate IX. Fig. 7, d), this also is an appearance calculated to confirm an erroneous impression that some external violence has been the source of it. If, moreover, the acromion process be found divided, as it

frequently is, into two portions (see Plate III. Fig. 2, B, E), the prejudice in the observer's mind, we can easily imagine, may be strongly in favour of the idea that accidental violence has been the origin of these many and combined phenomena.

But notwithstanding all these lesions, namely, the total disappearance of the articular portion of the tendon of the biceps, the perforation of the superior part of the capsular ligament by the head of the humerus, and the separation into two portions of the acromion process,—I feel convinced that all these phenomena combined should by no means be considered as proof of any accident having occurred to produce them; but, on the contrary, be looked upon as the usual result of chronic rheumatic arthritis of the shoulder. The tendon of the biceps in all those cases of presumed accidents is *said* to be ruptured, yet the chronic disease of the shoulder-joint is frequently found to affect both shoulder-joints in the same individual, and the long tendon of the biceps in these cases to be removed on both sides. It is easy to conceive that this double lesion may be the effect of disease, but it is difficult to imagine how any accident could occur to rupture the tendon of the biceps in both shoulder-joints; nor is it very easy to admit that the long tendon of the biceps can be readily ruptured in *partial* dislocations of the humerus from accident, when we know that this tendon is rarely, if ever, ruptured, even in *complete* luxation of the bone. The statement made in the report of various cases in surgical works, and in

catalogues of museums, in which we find it briefly noted, "that the tendon of the biceps was found ruptured," has been made by the writers confessedly without any knowledge of the previous history of the case, the anatomical characters of which they are describing. On this account I feel the less delicacy, after long and patient consideration of this subject, in expressing my conviction that the tendon of the biceps in the numerous cases published was not, as was supposed, ruptured by accident, but that it was absorbed as the result of disease.

I have thought it necessary to enter into this subject thus minutely, because I am convinced that up to the present hour these remarkable appearances when met with have been misunderstood even by some of the most intelligent anatomists and physicians;* this circumstance may appear, perhaps, capa-

* Although for the last seventeen years the author has, in various places, continued to express these opinions, they seem to have been neither refuted nor adopted, and therefore they are again repeated here.

In an able memoir on Chronic Rheumatic Arthritis of the Shoulder, by Professor Smith, contained in the February and May Numbers of the Dublin Quarterly Journal of Medical Science, 1853, he gives a critical analysis of twenty-four cases, adduced by different authors, as examples of the result of injury of the shoulder, but which he clearly shows to be really specimens of chronic rheumatic arthritis.

"It is true," he says, "that many of them were published at a period when but little was known of this remarkable affection; their authors are, therefore, to a certain extent excusable for having fallen into error respecting the nature of the morbid appearances which they have described; but it is also true that very many have been recently placed upon record, although we now possess full information respecting the symptoms, diagnosis, and pathology of chronic rheumatic arthritis, no matter in what articulation it may be seated."

ble of explanation, by recollecting that the disease generally runs a long course, is not in itself fatal; and hence, although the practical medical man may have had numerous opportunities of witnessing the symptoms of this disease in the living, he may never have had an opportunity in any case of informing himself of the true relation subsisting between the symptoms of this disease of the shoulder-joint as observed in the living patient, and the phenomena which the post-mortem examination of the same shoulder-joint might have presented. On the other hand, when anatomists have heretofore discovered accidentally in the dissecting-room appearances which we *now* know to be truly those of chronic rheumatic arthritis of the shoulder, they, unacquainted with these morbid appearances, have been easily led to draw erroneous conclusions respecting them, and to refer them to accident. The following case, therefore, may be useful, for here we have presented to us the symptoms of this chronic disease of the shoulder-joint the patient laboured under during life, and the appearances the post-mortem examination of the affected articulation revealed.

CASE VI.

CHRONIC RHEUMATIC ARTHRITIS OF THE SHOULDER, THE SYMPTOMS OF WHICH STRONGLY SIMULATED THOSE USUALLY ASSIGNED TO THE SUPPOSED CASE OF PARTIAL DISLOCATION OF THE HEAD OF THE HUMERUS, FORWARDS AND INWARDS, FROM ACCIDENT; WITH THE POST-MORTEM APPEARANCES IN THE AFFECTED ARTICULATION.

J. Byrne, a servant, aged 55, was admitted into the Whitworth Hospital, House of Industry, in 1834, under the care of the late Dr. Ferguson, in consequence of being afflicted with phthisis. My friend Dr. Mayne, at that time resident clinical clerk in the hospital, informed me, that besides the disease of the lungs, he had an affection of the right shoulder-joint, which presented all the characters attributed to the case of partial luxation of the head of the humerus; and was kind enough to invite me to examine him.

The patient complained of inability to use his right arm well, in consequence of his having for some years had an affection of his right shoulder-joint, in which he had almost continually a dull boring pain. He could, however, perform, without much inconvenience, all those motions of the arm which did not require it to be raised to the horizontal line; the joint felt to his own sensation somewhat stiff, and he was conscious under certain movements of the arm of a sense of something crepitating or crackling in the joint. Upon viewing the shoulder in front it had a

wasted appearance; the acromion process was more prominent, rendering the bony eminences around very conspicuous; the head of the humerus seemed to be a little higher than usual, and to have advanced somewhat forwards. The amount of advance was best seen by viewing the joint in profile or laterally. In this aspect a slight elevation, and the increase of the antero-posterior measurement of the joint, became very obvious. When the arm was grasped, and very slight force was used, the humerus could easily be made to descend somewhat, and at the same time to pass a little beneath the outer margin of the coracoid process, and the surgeon could readily sink his thumb into the outer half of the glenoid cavity, into the space the head of the humerus had abandoned. When, again, the shaft of the humerus was elevated vertically, its superior extremity could be felt to strike against the under surface of the acromion. In a word, while the symptoms were those of chronic rheumatic arthritis, they resembled those usually assigned to the partial luxation of the head of the humerus "*forwards and inwards.*" None of the other articulations were affected, and as to what was really the cause of the affection of the shoulder, it did not clearly appear. The man's own account was by no means satisfactory: he stated that he was a groom, and having been often thrown from his horse, he attributed the origin of the complaint in his shoulder to some contusion the joint on one of these occasions had suffered. This patient remained in the Whitworth Hospital until his

death, from phthisis, occurred. Dr. Mayne and I carefully examined the joint, which is still preserved in the Museum of the Richmond School (see Atlas, Plate III. Fig. 2).

POST-MORTEM.—We found the deltoid and other muscles around the joint in a wasted condition, and much paler than those of the opposite shoulder. When the capsular ligament was exposed, it was found to have superiorly much wider and more extensive attachments than natural. Instead of this fibro-synovial sac having its ordinary attachments *all* round to the limited circumference of the glenoid cavity of the scapula, its adhesion to the upper margin of this cavity did not exist, but the superior and outer portions of the capsular ligament (or rather of the fibrous membrane which here represented the capsule), was connected with the margin of the coraco-acromial arch, and thus the space in which the head of the humerus had been permitted to move had been rendered much more extensive than natural.

The capsular ligament was much thickened, and when opened more synovia than usual flowed out. This membrane was lined with cellular flocculi; and several small cartilaginous bodies, rounded, and of the size of ordinary peas, were seen to hang in the interior of the synovial sac, appended by means of fine membranous threads. All those parts which in the normal condition intervene between the superior part of the head of the humerus and the under surface of the coraco-acromial arch, were completely removed. No remnant or trace of the supraspinatus

tendon, nor any portion of the capsular ligament to which this tendon is attached, was to be found. The whole of the intra-articular portion of the tendon of the biceps was absent, and the highest point of the remaining portion of the tendon of this muscle was attached to the bicipital groove. It was remarkable that the acromion process and other portions of bone, viz., the outer extremity of the clavicle and coracoid process, had acquired size and density, although their under surfaces were much worn and excavated, where they formed an arch which overhung the humerus. These appearances showed the great degree of friction and pressure from below upwards which these bones had been subjected to, from the head of the humerus being constantly drawn upwards by muscular action. We also noticed that the *acromion process* was divided into two nearly equal portions by a line of separation passing, as it were, from within outwards (Plate III. Fig. 2, B, E). This might be supposed by some to have been a fracture which never had been united by bone, an opinion, however, I did not entertain; the two pieces of bone were on a perfect and uniform level, and the edges of the division in the process of bone exhibited no evidence of any ossific deposit, or such appearances as would lead us to infer that a fracture had existed.

The *glenoid cavity* of the scapula was larger than usual, deeper, and more of a circular and cup-like form. The glenoid ligament and cartilage of incrustation were removed, exposing a porous arti-

cular socket, around the circumference of which several round cartilaginous nodules had been produced, while rounded foreign bodies adhered to the interior of the synovial capsule of the joint.

The head of the humerus was somewhat enlarged, it had lost its rounded globular form, and had acquired an ovoidal shape.

The articular surface had become enlarged, and extended over the superior margin of the greater and lesser tuberosity. Much of the cartilaginous investment of the head of the bone had been removed, and its place supplied by a porcelain-like deposit. The line which circumscribes the junction of the head of the bone to the shaft was studded all round with granular osseous elevations overhanging the imaginary line, which has been denominated the anatomical neck of the humerus (see Plate III. Figs. 2 and 3).

Our knowledge of the anatomical characters of this disease has now arrived at a degree of precision sufficient, we should suppose, to save us henceforth from falling into the error of confounding appearances, the results of chronic rheumatic arthritis of the shoulder, with those which are the consequence of any other disease or accident. Nevertheless, I feel myself called upon here to allude to some cases of "*partial luxation of the shoulder-joint*," which have been brought forward as the result of accident, but

which I consider to be examples of the chronic rheumatic disease we have now under consideration.

Sir Astley Cooper, in his description of the accident denominated by him "*partial luxation of the shoulder-joint forwards and inwards,*" to the coracoid process, gives a case which he considered one of this accident, and relates the symptoms by which it can be recognised in the living; but for its anatomical characters he is obliged to refer to a specimen of an abnormal shoulder-joint accidentally found in a dissecting-room, the history of which was altogether unknown. He observes,—“The only dissection of this accident which I have had an opportunity of seeing was the following, for which I am indebted to Mr. Patey, Surgeon, Dorset-street, who had the subject brought to him for dissection at the anatomical room, St. Thomas's Hospital.”

The following is Mr. Patey's account:—

CASE VII.

“PARTIAL DISLOCATION OF THE HEAD OF THE OS HUMERI.

“The appearances were as follows: the head of the os humeri, on the left side, was placed more forward than is natural, and the arm could be drawn no farther from the side than the half way to an horizontal position.

“DISSECTION.—The tendons of those muscles which are connected with the joints were not torn, and the capsular ligament was found attached to the corac-

roid process of the scapula. When this ligament was opened it was found that the head of the os humeri was situated under the coracoid process, which formed the upper part of the new glenoid cavity; the head of the bone appeared to be thrown on the anterior part of the neck of the scapula, which was hollowed, and formed the lower portion of the glenoid cavity. The natural rounded form of the head of the bone was much altered, it having become irregularly oviform, with its long axis from above downwards; a small portion of the original glenoid cavity remained, but this was rendered irregular on its surface by the deposition of cartilage. There were also many particles of cartilaginous matter upon the head of the os humeri, and upon the hollow of the new cavity in the cervix scapulæ, which received the head of the bone. At the upper and back part of the joint there was a large piece of the cartilage, which hung loosely into the cavity, being connected with the synovial membrane, at the upper part, only by two or three small membranous bands. The long head of the biceps muscle seemed to have been ruptured near to its origin at the upper part of the glenoid cavity, for at this part the tendon was very small, and had the appearance of being a new formation."

The foregoing dissection, which is illustrated by an engraving in Sir A. Cooper's work on Fractures and Dislocations, and copied into all, even the latest editions, should not, in my opinion, be

considered in any other light than as an excellent account of the anatomical appearances to be found in those who have had chronic rheumatic arthritis of the shoulder-joint; for I consider that these appearances were not the result of an accidental luxation, but the true effects of this slow chronic disease.* If Sir A. Cooper had known anything of the history of the case during life, we might hesitate to call in question the opinion of so eminent an authority on such a subject; but as the only grounds he possessed for forming any opinion were derived from the mere anatomical appearances observed in the shoulder-joint of the subject in the dissecting-room, on this account I conceive that every one who studies the report of this dissection, accompanied as it is by an engraving, is at liberty to draw his own conclusion as to what was the real nature of the case.

* Professor Smith, in the memoir already alluded to, when specially commenting on this case brought into notice by Sir Astley Cooper, observes, that it is familiarly known to the profession, and generally quoted by surgical writers; but adds:—

“I may, however, remark, that it is much more extensively known as an instance of what it is not, than as an example of what it really is. It is this case which is always adduced in support of their doctrine, by those who maintain the possibility of the occurrence of such an accident as partial luxation of the head of the humerus upon the outer side of the coracoid process.

“Many years have elapsed since the publication of the great work of Sir Astley Cooper, and numerous and valuable are the memoirs and essays that have, since that time, appeared upon the injuries of the shoulder-joint; but in almost every one of these treatises, whenever mention has been made of this specimen (found accidentally in the dissecting-room, and of the previous history of which all are ignorant), it has been referred to as an undoubted example of the effects of external

To me it seems quite clear that the appearances observed in the examination of the case referred to by Sir A. Cooper were exactly those most frequently found to be the result of chronic rheumatic arthritis, as it affects the shoulder-joint: the new form assumed by the head of the humerus; the fact of the cartilage having been removed, and its place supplied by an ivory enamel; the piece of cartilage which hung loosely into the cavity, being connected with the synovial membrane at the upper part only by two or three small membranous bands; the attachment of the capsular ligament to the coracoid process,—all these circumstances, related in the above-mentioned case, strongly remind us of the characteristic traces of this disease we have denominated chronic rheumatic arthritis, as we have so often met with them. Add to this the observation that the intra-articular

injury, and as affording satisfactory confirmation of an opinion, the correctness of which is highly improbable, namely, that it is possible for the smooth and lubricated surface of the globular head of the humerus to rest permanently upon the margin of the glenoid cavity. And yet the real nature of the case recorded by Sir Astley Cooper, and its true pathology, have been, upon several occasions, clearly demonstrated, and brought prominently before the profession by Mr. Adams, as, for instance, in his observations upon the subject made to the British Association in 1836 (see *Athenæum*, September 10th, 1836), in his memoir upon the ‘Abnormal Condition of the Shoulder-Joint,’ published in 1849 (*Todd’s Cyclopædia*, vol. iv.), and in his numerous communications made to the Pathological Society of Dublin, and recorded in the volumes of both Series of this Journal. But when an erroneous opinion, pronounced by an eminent and justly distinguished author, once becomes generally diffused, it frequently happens that years must elapse before it is overthrown, and truth established in its place.”—*Professor Smith, loc. cit.*

portion of the long tendon of the biceps muscle did not exist, or is presumed to have been *ruptured* at its origin: in all these details we find a very complete account of the anatomy of the shoulder-joint, which had been the seat of chronic rheumatic arthritis.

On the other hand, such appearances afford no evidence whatever that an accidental luxation was the cause of them. Certain it is, that appearances exactly resembling those described as existing in Sir A. Cooper's specimen have been met with in cases in which their cause could not be attributed to accident, because no injury had been received; while in others it was needless to refer to accident, inasmuch as the morbid action had similarly affected *both shoulder-joints*; so that by the dissection of such cases I am convinced that disease, not accident, was the source of the morbid appearances. I have had an accurate copy made of the engraving which Sir A. Cooper has published, of what he has called the anatomy of partial luxation of the humerus (Plate III. Fig. 1), and alongside of it I have placed another of a shoulder-joint taken from the dead body of an hospital patient, who had been long affected with chronic rheumatic arthritis, and for some time under observation in hospital* (see Plate III. Fig. 2); and it appears to me that all who carefully read the account of the dissection of the two cases, and compare the two engravings, must admit, that whatever circumstances influenced the production of the morbid appearances

* See case of J. Byrne, page 118.

in the one were identical with those which produced them in the other.

Sir A. Cooper, in my opinion, somewhat *gratuitously* supposes that his specimen was the much sought for example of the anatomy of the accident called partial luxation. I say *gratuitously*, because the previous history of the case he alludes to was unknown, and the accident was only *supposed* to have occurred.

In the case I have adduced (J. Byrne) and illustrated by engraving, Plate III. Fig. 2, the history was known, and has been preserved, with the account of the post-mortem appearances which the examination of the shoulder-joint presented.

At the meeting of the British Association at Bristol, in September, 1836, I gave to the Medical Section an account of this chronic rheumatic disease as it engages most of the joints.* When speaking of its effects on the shoulder, I alluded to this case published by Sir A. Cooper, and then demonstrated, as I thought, to the satisfaction of the meeting, that the specimen of this chronic rheumatic disease which I laid before them for inspection (Atlas, Plate III. Fig. 2), corresponded exactly to the appearances found in the case of partial luxation of the humerus, supposed to have arisen from accident, delineated in Sir A. Cooper's work† (Atlas, Plate III. Fig. 1). The

* See *Athenæum*, *loc. cit.*

† Plate XXI. of Sir A. Cooper's great work on Dislocations. See also page 401 of Mr. B. Cooper's edition.

opinions I then expressed have since been amply confirmed by experience.

In the "Museum Anatomieum" of G. Sandifort (1827), we find delineated the bones of a shoulder-joint, which present all the characters of chronic rheumatic arthritis with partial displacement upwards of the head of the humerus (Fig. 6). Sandifort, also, I

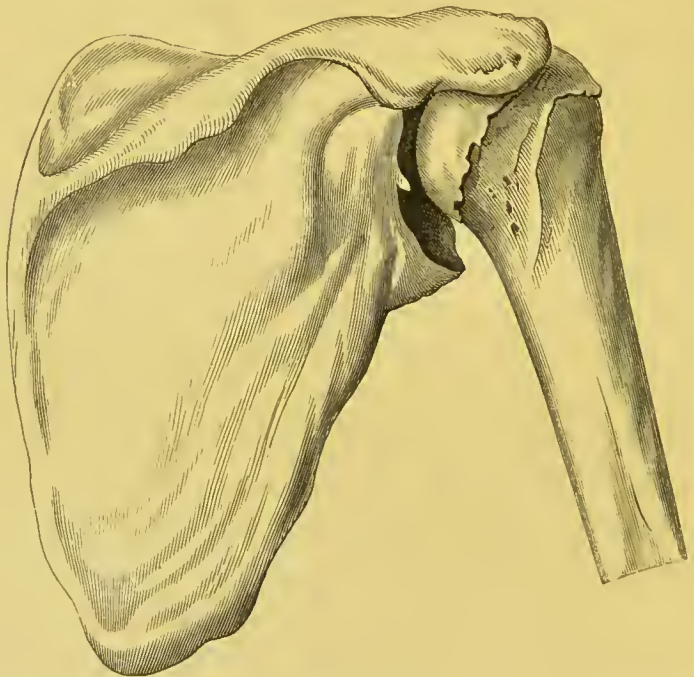


FIG. 6.

SANDIFORT'S CASE.—Partial dislocation upwards, *supposed* to have been a dislocation from accident.

feel certain, has fallen into an error in coming to the conclusion that this specimen of the bones of the

shoulder-joint constituted an example of partial luxation *from accident*, “luxatio ossis humeri ab injuriâ externâ.” On the contrary, I would look upon this case also as an example of chronic rheumatic arthritis of the shoulder, the head of the humerus having been partially displaced upwards, as it very commonly is, as the result of this disease.

CASE VIII.

The subject of Sandifort's case was a robust man. The head of the humerus having been “driven upwards” between the coracoid process and the acromion, a new articular surface was produced partly on the upper narrow part of the glenoid cavity, and partly on the root of the coracoid process. This new articular surface was in parts porous, and in other parts much polished, and ivory-like (“partim porosa sed cæterum valde polita ac quasi eburnea”), and had been in habitual contact with the head of the humerus. The latter was much enlarged, and the measure of its circumference round the corona of the head was much increased by the addition of a hard, everted margin, “margine revoluto calloso.”

The wearing away of the upper part of the great tuberosity, the eburnation of the summit of the humerus where it came in contact with the concavity of the acromion,—even the preternatural contact of the head of the humerus with the under surface of the *acromial extremity of the clavicle*, a pe-

cularity we have already observed upon,—are all noticed in this specimen thus:—“Caput ossis humeri, amplitudine auctum margine revoluto calloso, in superficie articulari offert eandem præternaturalem glabritiem ac duritiem, dum in vertice ubi tuberculum majus occurrit, superficiem exhibet partim glaberrimam, partim inæquabilem, rugosam, quæ juxta summum humerum movebatur; triturationem etiam locum habuisse inter marginem inferiorem claviculæ et verticem capitis humeri manifeste apparet. *Subluxatio in superiora ergo hic locum habuit.*”* Here we find the description of the bones unaccompanied with any account of the anatomical characters of the other structures of the joints; nor is there any proof adduced that any accident had occurred to produce the appearance noticed; we may, therefore, we think, conclude that the history of the case was unknown. When we compare Sandifort’s description of the above case, accompanied as it is with an engraving, with the account given in the preceding pages of the dissection of other cases of chronic rheumatic arthritis as it affects the structures of the shoulder-joint, I think we may safely conclude that this case, adduced by Sandifort as an example of partial luxation of the head of the humerus from external injury, must be considered as presenting in the bones described the anatomical characters of chronic rheumatic disease,

* Museum Anatomicum, G. Sandifort, Tab. CLI. 2, 3, vol. IV.

as it very commonly affects the bone of the shoulder-joint.

In the London Medical Gazette, vol. xiv., Mr. J. Gregory Smith has inserted a paper, entitled "The Pathological Appearances in seven cases of Injury of the Shoulder-Joint." The specimens were met with in the dissecting-room. Their history could not be ascertained.

That these appearances were really the result of injury or accident cannot be, by any means, proved; while, on the other hand, the description of the joints will be found on close examination to present the ordinary anatomical signs of chronic rheumatic arthritis, as seen in each of the articular textures.

Some time after the appearance of this paper, Mr. Edwin Canton, of London, in an essay on chronic rheumatic arthritis of the shoulder, did me the favour of alluding to my early opinions upon this matter. He says:—

"Mr. Adams, in writing to me on the subject of the effects of chronic rheumatic arthritis of the shoulder having been frequently mistaken for the effects of accident, remarks, 'There is no joint which has been the subject of more mistakes relative to this disease than the shoulder. Almost all the cases published have been supposed to have been those of partial dislocation (from accident), the history of the case being in ninety-nine out of an hundred unknown.'"

Mr. Canton, entertaining a similar opinion to that which I had so repeatedly expressed, wrote to Mr. J. Gregory Smith. "Being desirous," he says, "of ascertaining from Mr. Smith, whether from subsequent experience he had found reason to alter his opinion regarding the origin of the morbid phenomena, I wrote to that gentleman on the subject, and have to acknowledge his prompt attention to my letter, and the frankness of his reply. He writes:—

"'I was in the first instance disposed to view those appearances as purely the result of injury, but the frequency of their occurrence, and the similarity, to a greater or less extent, of the apparent mischief, induced me afterwards to come to a different conclusion, and to view them rather as the destructive results of long-continued chronic inflammation of the fibrous tissues.'"*

This matured opinion expressed by so experienced an anatomist, as to the nature of the specimens he had himself adduced, concurring, as it does, with the judgment formed as to them by those who have *specially* directed their attention to the subject, may, in my opinion, be considered as conclusive, that these appearances described by Mr. J. Gregory Smith were not produced by injury, but that they were the ordinary results of chronic rheumatic arthritis of the shoulder; and that henceforth we may avail ourselves of them as valuable illustrations of the anatomical characters of this disease.

* Notes on the Morbid Anatomy of Chronic Rheumatic Arthritis. By Edwin Canton, F. R. C. S. Also, Medical Gazette, 1848.

Without following seriatim the description given of each of these specimens adduced, let us in a synoptical manner consider the morbid changes which were noticed to have taken place in each of the articular textures, namely, in the fibro-synovial, the tendinous, and in the osseous structures in these specimens.

1. The capsular ligament in most of these specimens was thickened and hypertrophied; it was more capacious than natural, allowing of the head of the humerus being placed beneath the coracoid process; in many of the cases a large opening existed in the capsular ligament at its upper part, through which the subdeltoid bursa communicated freely with the general cavity of the shoulder-joint. Other morbid changes were also noticed, such as the deposition of pieces of bone in the capsular ligament close to the margin of the glenoid cavity, as if a piece had been fractured off; and in the interior of the synovial capsule a fibro-ligamentous substance was noticed to extend across the cavity of the joint.

2. As to the state of the *tendons* in these seven specimens, we find that those of the capsular muscles were detached from the tubercles of the humerus. In all the specimens the long tendons of the biceps were found to have been in an abnormal condition. Five of these tendons had the *appearance* of having been ruptured. As to their intra-articular portion they were either totally or partially absorbed; and their extra-articular portion was adherent outside to the edges of the bicipital groove.

In one subject, the long tendon of the biceps, in the right and left shoulder-joint, was symmetrically displaced internally to the head of the bone, and one of these tendons presented a ravelled appearance.

3. As to the *bones*, we recognise appearances described with which we are quite familiar, as being those of the ordinary characters of this chronic rheumatic disease. We find that in many points of contact of the articular surfaces a process of eburnation had taken place, while osseous growths were connected with the tubercles of the humerus and margin of the glenoid cavity.

The head of the humerus was found to present a larger surface of bone than usual, and the upper margin of the tubercles had become articular; an ivory-like deposit coated them, as well as the under concave surface of the acromion.

There was noticed in one individual the detachment of the extremity of the acromion process from the spine of the scapula on both sides.

Thus, then, the singular lesion, consisting in the symmetrical dislocation inwards of the tendon of the biceps in both shoulder-joints of the same individual, and the not less remarkable organic change, namely, the detachment of the acromion process from the spine of the scapula being also symmetrical, existing in the right and left shoulder of the same subject,—all these facts place it beyond a doubt, that accidental injuries never could have given rise to these symmetrical lesions. These, on the contrary, exhibit to us nothing but phenomena abundantly

proved to belong to the ordinary anatomical characters of chronic rheumatic arthritis.

I might add to these cases of chronic rheumatic arthritis of the shoulder, with partial displacement upwards of the humerus, here adduced, many similar examples, which have been published, and gratuitously assumed as specimens of the immediate effects of accident: but in the present state of our knowledge this seems scarcely necessary.

The cases already brought forward, and still to be adduced in this Chapter, should, in my opinion, be deemed sufficient, more particularly as Professor Smith, in the memoir already alluded to, and to which I would refer, has, in his critical analysis of some recently reported cases of the above description, done ample justice to this part of our subject.

The condition of the bones of the shoulder-joint discovered on making the post-mortem examination in cases where the head of the humerus had been partially dislocated upwards under the influence of this disease, seems now to be very well known; but the anatomy of the soft parts in these cases has been too frequently overlooked.

In the post-mortem examination of advanced cases of this disease of the shoulder-joint I have witnessed, in which there *had been partial luxation upwards*, when the deltoid muscle has been cut through, the head of the humerus has been generally found either

in absolute contact with the under surface of this muscle, having passed through the upper part of the capsular ligament, or it has been merely separated from it by the subdeltoid bursa, and has in these advanced cases of partial displacement upwards been found to have the characteristic appearances it presents under the influence of the disease called chronic rheumatic arthritis. The intra-articular portion of the tendon of the biceps is removed, and all those structures which in the normal state intervene between the summit of the head of the humerus and the under surface of the coraco-acromial arch are absorbed. The superior portion of the capsular ligament is usually found perforated, so that the under surface of the coraco-acromial vault comes into contact with the head of the humerus, and is converted into a supplementary socket for it.

The explanation of the circumstance of the superior part of the capsular ligament having been found thus perforated, leaving a large circular opening through which the head of the humerus can pass, appears to be, that this bone is elevated by the active exertion of the deltoid and other muscles; these are excited into action by the irritation which has commenced in the chronic affection of the articular textures having been communicated to these muscles, which consequently maintain the bone pressed up against the under surface of the acromion. From this as well as other causes, the head of the bone acquires altogether a new form; its summit becomes expanded, and at the same time smoothed by the

constant effect of use and attrition; the anatomical neck of the humerus is encroached upon, and gradually the whole summit, including the great and lesser tuberosities, becomes articular: these latter eminences being, as it were, ground down, and covered with a porcelainous deposit; and, moreover, as the upper portion of the circular groove, called the anatomical neck of the humerus, which usually gives attachment to the capsular ligament, has been removed, the connexion of this ligament to the bone must be destroyed, and a large opening of necessity left, through which the head of the humerus can pass (see Atlas, Plate x. Fig. 5).

The loss of the long tendon of the biceps muscle in these cases will, no doubt, facilitate the partial displacement upwards, but we must agree with Professor Smith that the view that such a lesion is absolutely necessary to such an effect, cannot any longer be maintained in opposition to a case brought forward by him before the Pathological Society. In this case the head of the humerus was partially displaced upwards, and indeed bore evidence of having been long in habitual contact with the under surface of the acromion process. Yet the tendon of the biceps was in its place, and both it and the capsular ligament in this instance maintained their continuity, the loss of which has been heretofore referred to, as the lesion permitting of the displacement upwards of the humerus.

CASE IX.

Dr. Hamilton Labatt, when Demonstrator of Anatomy at the College of Surgeons, communicated to the profession a case of chronic rheumatic arthritis of the shoulder, with dislocation upwards, which illustrates well the condition of the bones and soft part when this disease has been of long standing. He has named the case "an excellent specimen of that chronic disease of the shoulder-joint which old people are liable to; as also an example of partial luxation upwards, the result of that disease."*

The history of this case, as of almost all of the same kind published, was unknown. The subject was a female, aged 60, brought into the College of Surgeons for dissection. The muscular system was well developed; the common integuments had been removed when Dr. Labatt was called to witness the dissection, and the deltoid muscle was cut across and thrown back, when the attention of the dissector was attracted by the head of the humerus, which was exposed, and firmly supported against the under surface of the acromion process, by the lips of a vertical rent in the capsular ligament (which was otherwise healthy) firmly girding the anatomical neck of the humerus. The articular cartilage of the head of the humerus had been universally eroded;

* *Vide* London Medical Gazette, 1838, vol. xxii. p. 22; also Catalogue, College of Surgeons, Ireland, vol. ii. p. 396.

the head was increased in size by the addition of an osseous margin, which overhung the anatomical neck of the bone. Several cartilaginous bodies connected to the surrounding tissues projected into the cavity of the joint. The larger were pedunculated and pendulous, whilst the smaller were attached by broad surfaces. The articular part of the tendon of the biceps had disappeared. The capsular ligament was thickened, and the aperture, already mentioned, which existed in the upper part was sufficiently capacious to allow the head of the bone, under certain circumstances, to pass with facility from its natural situation upwards, and to come in contact with the under surface of the acromion process.

The coraco-acromial articulation of the same side, as well as several other articulations in this subject, exhibited unquestionable traces of having been affected with the same disease.

Although the history of Dr. Labatt's case was unknown, the appearances which the head of the humerus presented were sufficiently characteristic to clearly designate the true nature of the affection. Independently of the condition alluded to of the coraco-clavicular and other articulations, there were many concurring circumstances to be noticed, which sufficiently proved that in the above case the shoulder had been long affected by chronic rheumatic arthritis, a disease with which he was well acquainted; and that this, and not accident, was the source of the partial luxation upwards which existed.

CASE X.

In April, 1840, Dr. Robert Smith laid before the Surgical Society of Dublin an account of the post-mortem examination he had made of an aged female, who died of an internal organic disease in the House of Industry. She had been long affected with a partial displacement upwards of the right humerus, which was the result of chronic rheumatic disease. He presented a cast of the upper part of the body, taken after death, showing the degree of elevation of the summit of the humerus on the affected side; and also exhibited a preparation of the shoulder-joint to the meeting.

“It may be seen,” he said, “from the cast, that in this case there was a remarkable contrast in the appearance the two shoulders presented: on one side the head of the humerus was placed far above the level of the coracoid and acromion processes. Many persons,” he added, “in viewing the cast and accompanying preparation, might consider the specimen as one of some unusual form of congenital malformation, or the result of accident, but the abnormal appearances were clearly the result of that peculiar affection of the joints of which so many specimens had been elsewhere brought forward by the President in the Chair, Mr. Adams, and which disease he has denominated chronic rheumatic arthritis.” Dr. Smith added, “that his chief reason in bringing forward the case was, that it presented some peculiari-

ties he had not observed in other specimens of the same disease as it affects the shoulder-joint. He had often before noticed the elevation of the head of the bone as a symptom of this affection, but had never seen the elevation to the same degree it had amounted to in this case. The head of the humerus was displaced upwards, even to a point above the level of the clavicle and acromion process. The capsular ligament was very much attenuated, but dilated, and as thin as if constituted solely of synovial membrane; superiorly this capsule was altogether deficient; here a large aperture was found, which permitted the head of the humerus to pass upwards, as already mentioned. The tendon of the biceps was perfect, but was thrown off *the head of the bone* inwards. The cartilage of the head of the bone was abraded in several places, and osseous depositions had been formed in the vicinity of the bicipital groove, and around the margin of the articular surface of the head of the humerus, as is usually the case in specimens of chronic rheumatic disease. The preparation, Mr. Smith repeated, showed a large deficiency in the upper part of the capsular ligament,—a fact not observed by him until he had seen Dr. Labatt's specimen, and even then he was at first disposed to attribute the deficiency to some injury received in removing the parts. He had, therefore, taken the greatest care in removing the preparation just exhibited to the Society, and had found that on dividing the deltoid muscle he had cut at once into the cavity of the joint. It may be remarked, that in this

ease the acromion process had been much reduced in thickness, its under surface was excavated, and denuded of all periosteal covering. This process was divided into two portions, as if a fracture had traversed the original line of the junction of the epiphysis with the rest of the process; half an inch in extent of the bone was thus separated from the rest, and seemed merely retained by a ligamentous connexion. The coraco-clavicular and triangular ligaments were relaxed, and in the dead body the shoulder-joint presented in this case a remarkable degree of laxity and mobility. Dr. Smith thought the great peculiarity of the case consisted in the circumstance, that the long tendon of the biceps was not, as it usually is in cases of this chronic disease, absorbed, but was in a state of perfect integrity, and thrown off the head of the humerus and placed inwardly."

Having proceeded so far with the account of the displacement upwards that the head of the humerus undergoes, as the result of chronic rheumatic arthritis, I may, perhaps, be excused if I merely repeat here what I have already written in another work,* on the displacement of the tendon of the biceps, and partial dislocation upwards of the head of the humerus:—

"Questions here naturally arise, can the tendon

* London Cyclopædia of Anatomy and Physiology: Abnormal Shoulder-Joint: vol. III. page 594.

of the biceps be dislocated from the groove by accidental violence? and if so, shall the consequent dislocation of the head of the humerus be in the direction upwards, exactly as it was in the preceding case, which was evidently an example of the displacement of the tendon from disease?"

Mr. John Soden, Junior, of Bath, brought before the Medico-Chirurgical Society of London a case of partial dislocation of the head of the humerus upwards, with displacement inwards of the long tendon of the biceps; he accompanied it with remarks, the objects of which were to prove, that the tendon of the biceps may be dislocated by accidental violence, and that dislocation upwards of the head of the humerus must follow as an immediate consequence. This case has been published in the Transactions of the Society for the year 1841, and is reported as follows:—

Joseph Cooper, aged 59 years, was admitted into the Bath United Hospital, November 9, 1839, on account of a compound fracture of the skull. His death, six months after the accident, afforded an opportunity of examining the injury of the right shoulder, the symptoms of which had been always involved in great obscurity, and which occurred in the following manner:—

In the month of May, 1839, the deceased (six months before his death) was engaged in nailing down a carpet, when, on rising suddenly from his occupation, his feet slipped, and he fell backwards on the floor. In order to break the force of the fall, he

involuntarily placed his arm behind him, and by so doing received the whole weight of the body upon his right elbow; that joint, the only one struck, received no injury, for the shock was instantly transmitted to the shoulder, and there the whole effects of the accident were sustained. Acute pain was immediately experienced, and the man supposed he had either suffered a fracture or a dislocation, but finding that *he could raise the arm over his head*, he felt reassured, and endeavoured to resume his work. The pain, however, compelled him to desist, and he went home. "When I saw him," says Mr. Soden, "on the following morning, the joint was greatly swollen, tender to the touch, and painful on very slight motion. There was then no possibility of his placing his arm over his head, as he had done immediately after the accident. Mr. Soden satisfied himself that there was neither fracture nor dislocation of the bones; and not suspecting the existence of a more specific injury than a severe sprain, set down the case as such, and avoided the unnecessary pain of further examination. Unusually active means were necessary to subdue the inflammation, and at the end of three weeks, though the swelling was much reduced, the tenderness in the front of the joint, and pain on certain motions of the limb, were scarcely less than the day after the occurrence of the accident.

"On comparing the joint with its fellow, now that the swelling had subsided, a marked difference was observable between their respective outlines: the injured shoulder was evidently out of drawing, but

without presenting any glaring deformity. When the man stood erect, with his arms dependent, the distinction was very manifest, but difficult to define. There was a slight flattening on the outer and posterior part of the joint, and the head of the bone looked, as it were, drawn up higher in the glenoid cavity than it should be. Examination verified the appearance in two ways : first, on moving the limb, with one hand placed on the shoulder, a erepitating sensation was experienced under the fingers, simulating a fracture, but in reality caused by the frietion of the head of the humerus against the under surfaee of the acromion ; secondly, on attempting abduction, it was found that the arm could not be raised beyond a very acute angle with the body, from the upper edge of the greater tubercle coming in eontact with that of the acromion, and thus forming an obstacle to all further progress. The head of the bone was also unduly prominent in front, almost to the amount of a partial dislocation. For all useful purposes the arm was powerless. The pain caused by the action of the biceps was acute, extending through the whole course of the musele, but felt chiefly at its extremities. When the joint was at rest, the pain was referred to the spae in front between the coraeoid process and head of the humerus, which spot was marked by extreme tenderness, and some puffy swelling.

“ The patient being of a *rheumatic habit*, inflammatory action of that character was soon established in the joint, so that the peculiar symptoms of the

injury were marked by those of general articular inflammation, which added greatly to the man's suffering, and to the difficulty of diagnosis.

“POST-MORTEM.—On examining the joint, the accident was found to have been a dislocation of the long head of the biceps from its groove, unaccompanied by any other injury. The tendon was entire, and lay enclosed in its sheath on the lesser tubercle of the humerus; the capsule was but slightly *ruptured*; the joint exhibited extensive traces of inflammation; the synovial membrane was vascular and coated with lymph; recent adhesions were stretched between different parts of its surface, and ulceration had commenced on the cartilage covering the humerus, where it came in contact with the under surface of the acromion; the capsule was thickened and adherent, and in time probably ankylosis of the joint would have taken place.”*

In this case, it is true that the tendon of the biceps was found dislocated; but are the appearances noticed during life, and found on examination after death, capable of any other interpretation than that given to them by Mr. Soden? Upon such a matter I feel I ought to speak with diffidence, because this case differs from almost every one of partial luxation yet published, in this circumstance, that its history was known before the post-mortem examination of

* Medico-Chirurgical Transactions, 1841.

the joint was instituted. However, I must confess, that I do not by any means feel convinced that the lesion of partial displacement upwards of the head of the humerus as the immediate result of accident has been proved by Mr. Soden.

If we analyze the symptoms the patient reports himself to have observed immediately after the accident, we find that he at first supposed he had either suffered a fracture or dislocation, but finding that "*he could raise the arm over his head,*" he felt reassured, and endeavoured to resume his work. It would appear to me, that if the tendon of the biceps were accidentally dislocated, the patient should not have been able immediately after the accident to raise his arm over his head, but the circumstance here noticed, on the other hand, seems quite reconcilable with Mr. Soden's first impression, that there was in this instance no other injury than a severe sprain of the joint. The symptoms under which the patient subsequently laboured were just those of that inflammatory nature which might be expected to have occurred in any ordinary case of so severe a sprain as we may suppose the shoulder-joint to have suffered in this instance. The appearances the joint presented externally, when the disease became sub-acute or chronic, namely, the flattening of the outer and posterior part of the joint, and the appearance of the head of the bone, which had been drawn *up higher* in the glenoid cavity; the *crepitating* sensation caused by the friction of the head of the humerus against the under surface of the acromion (which

could scarcely have existed without having been preceded by disease); the pain felt in the whole course of the biceps muscle; the difficulty experienced in abduction of the elbow from the side; the prominence of the head of the bone in front almost to the "amount of a partial dislocation,"—all these symptoms I have repeatedly noticed to belong to the affection of the shoulder-joint which I have called *chronic rheumatic arthritis*, and have been present in patients who have had this disease in both shoulder-joints at the same time, and in whom they could not by any means be stated to be referrible to accident. Finally, before we dismiss the part of our analysis of this case which refers to the symptoms, we must not omit to allude to the author's own observation:—"The patient being of a *rheumatic habit*, inflammatory action of that character was soon established in the joint; so that the peculiar symptoms of the injury were masked by those of general articular inflammation, which added greatly to the man's suffering and to the difficulty of diagnosis."

If the patient were of a rheumatic habit, or predisposed to this disease in his joints, it may be readily conceived that any injury this man, aged 59, might receive in the shoulder-joint should have been calculated to set in action the disease called chronic rheumatic arthritis.

As to the anatomical examination of the joint, it will be recollected that the disease had not been long established; and, therefore, that the more striking results of chronic rheumatic disease should be found,

was not to be expected. Those which were noticed, however, were just such as might be supposed to represent the anatomical characters of chronic rheumatic arthritis of the shoulder in an early stage.*

I had written thus much on the subject of partial dislocation of the head of the humerus upwards, with displacement inwards of the long tendon of the biceps, when, on the 12th of August, 1848, an opportunity occurred to me of examining, anatomically, both shoulder-joints of a patient who had died in the North Union Workhouse on the day previously. He had been for eight years under Dr. Kirkpatrick's observation, and was one of the severest sufferers I had ever known from chronic rheumatic disease in all his joints.

It was very remarkable, that on examining anatomically both shoulder-joints in this case, we discovered a similar partial displacement upwards of the

* Besides the notice of this case already mentioned, contained in the Medico-Chirurgical Transactions, 1841, it has been subsequently (1842) set forth by Mr. B. Cooper, in his edition of Sir A. Cooper's work on Fractures, &c.

In the Third Volume of the Cyclopædia of Anatomy (Abnormal Shoulder, 1849), I have endeavoured to prove, by the reasons above stated, that Mr. Soden's view was erroneous, and that the appearances he has described were really the result of chronic rheumatic arthritis.

Professor Smith, who, as Curator (indeed I may say Fabricator) of the Richmond Hospital Museum, has had so much experience, and ought to be considered good authority on this subject, takes a view of the case similar to mine; for in the Memoir already alluded to, he says: "I cannot pass on without expressing my regret, that in several of the systematic treatises upon surgery that have even *recently* appeared, in which Mr. Soden's case has been mentioned, no allusion whatever has been made to the elaborate analysis of it in the Cyclopædia of Anatomy, in which I consider will be found '*a complete refutation of Mr. Soden's view of his own case.*'"

head of the humerus, with dislocation inwards of the tendons of the biceps *in both* shoulder-joints, and each of these dislocations exactly resembled that found in *one* shoulder-joint by Mr. Soden in his case.

The following is the history of this case, with an account of the post-mortem appearances the shoulder-joints presented :—

CASE XI.

Charles Mailly, aged 48, had been a carter in the country, and was remarkable for his strength and activity; he was addicted to drinking ardent spirits to excess, and it was stated of him, that he frequently lay whole nights in the open air in a state of insensibility from drunkenness. To these bad habits he attributed the origin of his disease, which at last disabled him from earning his bread. He was admitted into the North Union Poorhouse in 1840. When I visited him there in August, 1847, I learned that he had been confined to his bed for the last five years, that he could not walk, nor even stand upright. His hip-joints, knees, and elbow-joints, were semiflexed, and although this flexion could be increased, the limbs could not be extended. His neck was stiff, and he found much difficulty in bending it forward; his wrists also were rigid, and his fingers and toes presented the characteristic nodosity and distortion which belong to chronic rheumatic disease. His shoulders had an emaciated appearance, but the bones of the articulations seemed much enlarged,

and the heads of both humeri were somewhat elevated above the level of the coracoid process. The shoulders presented the usual signs of this disease, but he did not complain so much of them as he did of his hips, elbow, and knee-joints, which had been so much longer and more severely affected.

The integuments over the affected joints were sore to the touch, and even the weight of the bed-clothes, he thought, caused him to suffer; he complained that the changes in the atmosphere always increased his sufferings, and that he endured more during frosty weather than at any other time. The usual crackling sound, or articular crepitus, was noticed whenever any of the joints were moved.

The man's countenance and manner betrayed the delicacy of his health, as well as the great discomfort of his condition. His bowels were occasionally obstinate. The urinary secretion was natural.

In consequence of the stiff condition of the cervical vertebræ already mentioned, and the rigidity and useless state of the joints of the upper extremities, he was unable to feed himself, and became entirely dependent on others. He was released from this miserable state of suffering by an attack of diarrhœa, which carried him off at the time above specified.

POST-MORTEM EXAMINATION. — The hip-joints, elbows, and knees, were semiflexed, and could not be extended, the degree of flexion could be somewhat increased when any of the joints were moved, and the characteristic articular crepitus, or crackling, was equally elicited now as during life.

Right shoulder-joint.—On dissecting off the integuments from this articulation, the deltoid muscle was pale, and formed a thin, attenuated layer of muscular fibres covering the joint. When this muscle was detached, the subdeltoid bursa was exposed, and proved to be of a yellowish colour, and had a fibrous appearance somewhat like to a capsular ligament; when this bursa was cut into by an incision parallel to the margin of the acromion, its cavity was observed to be more capacious than usual.

The *capsular ligament* arose in the ordinary manner from the circumference of the glenoid cavity, and passed from this origin to be inserted into the humerus. Though sufficiently strong, it seemed much less extensive and shorter than usual, and had become attached posteriorly to the head of the humerus before it had reached its ordinary place of insertion into its anatomical neck. The capsule, by its attachment to the head of the bone, circumscribed an oval articular surface comparatively small. When the cavity of this ligament was cut into posteriorly (where the tendon of the infraspinatus, &c., covered it), adhesions were found to have existed between the interior of the capsule and the posterior part of the head of the humerus. When the capsule was opened anteriorly, where the tendinous insertion of the subscapularis covered it, it was now seen more evidently than before, that the head of the humerus had been placed habitually above the level of the coracoid process (Fig. 7, B), and the highest part of the glenoid cavity.

The intra-articular portion of the tendon of the biceps (Fig. 7, D) was now seen to lie entirely to the inside of the head of the humerus; indeed, such was its position, that it might be rather said that the humerus was displaced outwardly and elevated above

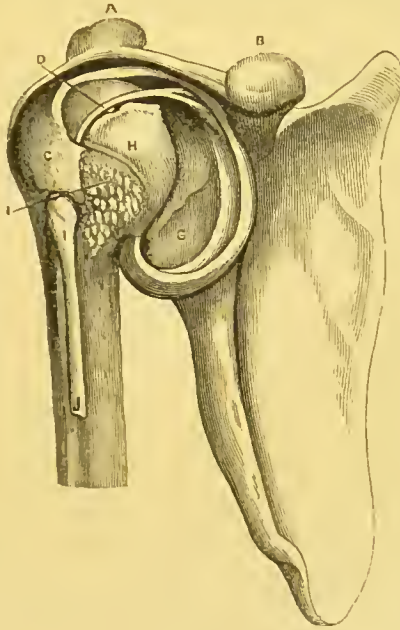


FIG. 7.

C. MAILLY'S CASE.—Right shoulder-joint: partial displacement upwards of the head of the humerus, with displacement inwards of the tendon of the biceps. The left was similarly affected.

the level of the course of the tendon of the biceps, than that the latter was dislocated inwards; a semi-circular groove in the cartilage marked the course of the tendon of this muscle as it arched across the inner side of the head of the humerus to join the bicipital groove much below its ordinary point of entrance into it. The tendon was somewhat diminished in thickness, except at the point where it was becoming

extra-articular, and here a rounded callosity existed, and it became adherent to the edges of the bicipital groove. The shortened condition of the capsular ligament, as well as the adhesions between the inner surface of this capsule and the head of the bone, maintained it in the abnormal state of elevation described.

The *head* of the humerus was enlarged and altered from its normal figure, particularly above, in the neighbourhood of the great tuberosity, which bulged out much externally. The portion of the head which was situated above the course of the tendon of the biceps was divested of all cartilaginous covering, was of a yellowish colour, and remarkably hard, and presented an appearance as if the summit of the bone had been prepared for eburnation, but as yet no ivory enamel had been formed, because as yet no process of attrition had commenced, nor had bone come into contact with bone. The under surface of the neck of the bone was furnished with a vast number of the synovial fimbriæ (Fig. 7, 1). These, when first examined in the recent state, were of a very red colour. The humerus seemed as if it had remained habitually in contact with the glenoid cavity, rotated inwards, and in this position these synovial fimbriæ lay in contact with the inferior and broadest part of the glenoid cavity; and it was very remarkable that wherever these red synovial fimbriæ had been in exact apposition with the cartilage of incrustation of the glenoid cavity, exactly in the extent of the contact, the cartilage had been removed, proving that

these vascular fimbriæ acted as absorbing villous surfaces. The glenoid cavity presented but little to be noticed, except a porous appearance (where its cartilaginous investment had been removed by the absorbing villi), and the commencing state of disintegration of the glenoid ligament. The cartilage which remained on a portion of the head of the humerus, as well as that which still adhered to the surface of the glenoid cavity of the scapula, was rough, and altered from its natural state.

The *acromio-clavicular* articulation of this side seemed enlarged externally, the periosteum appeared thickened. When the articular surfaces were exposed, it was found that their cartilaginous covering had been removed, and that they were nearly double their normal size.

It is quite plain that the movements of the head of the humerus in the glenoid cavity in this case had been confined to those of a species of semi-rotation only; the adhesions which were found to exist between the head of the humerus and the inner surface of the synovial membrane of the joint, as well as the new and oval form which the head of the humerus had assumed, sufficiently suggested this.

Left shoulder-joint.—This articulation in almost every respect was symmetrically affected, as was the right, but particularly as regarded the dislocation of the tendons of the biceps, the existence of fimbriæ, &c., and therefore it does not require a separate description.

It does not appear necessary to enter into any very

special details relative to the condition the other articulations were found in; it may be remarked, however, that they presented the general appearances that these structures usually exhibit in cases in which that inveterate constitutional form of chronic rheumatic arthritis exists, which causes the patient to be bedridden for years. For example, as to the lower extremity, "the cartilage of the head of the left femur was partially destroyed. The bone itself was rough, and appeared in a highly vascular condition, but *had no ivory deposit* on its surface; the lining membrane of the acetabulum was also very vascular, and the acetabulum itself was deepened. The articulating surfaces of the knee and ankle-joints, as well as those of the bones of the foot, particularly the metatarso-phalangeal articulation of the great toe, were all affected similarly to those of the hip already mentioned. The foot remained habitually on its outer edge. The tendon of the extensor communis was contracted, and there was partial dislocation backwards of the first phalanges of the fourth and fifth toes. The superficial and deep tendons of the flexor communis lay internal to the phalanges of these toes, having slipped from the groove in which in the normal state they are retained."* The lungs and other viscera were sound. I may mention, that upon looking to the state of the heart and its membranous coverings, we found the pericardium adherent to the heart on all its surfaces,

* This portion of the notes of this case were taken down by my pupil, Richard C. Todd, now Assistant-Surgeon, 71st Highland Light Infantry.

except where it lay on the diaphragm. From the state of the membrane covering the heart, we may, I think, feel pretty certain, that this individual once had rheumatic fever, and that out of this arose the general rheumatic disease of all his joints.

So far as the anatomical characters of the shoulder-joint are concerned, there is a marked similarity in the morbid appearances to be observed in the case adduced by Mr. Soden and in those of Charles Mailly, just related. The general constitutional symptoms were, no doubt, different. However, from all that has been stated, it would appear to me, that hereafter, whenever the tendon of the biceps shall be found displaced internally to the head of the humerus, we should not at once conclude that the lesion was the immediate effect of accident, but that inquiry should be made as to whether chronic rheumatic arthritis may not have been its cause.

In Mr. Soden's case, accident may have had just so much to do with the displacement of the tendon, that the injury became the immediate exciting cause of the development of a *local* disease, a predisposition to which had existed in the constitution of the patient.

In the case of Charles Mailly, the disease was the same, but it was a well-marked specimen of the constitutional form; while Mr. Soden's case presented, in my opinion, an equally well-marked example of the *local form* of the same denomination of disease.

I regret much I have not had any opportunity of examining the preparation of the shoulder-joint pre-

sented by Mr. Soden to the Museum, King's College, London; but at the time I was writing on this subject, I requested my colleague and former pupil, Dr. M'Dowel, at that time in London, and who was familiar with the many preparations of joints which had been affected with chronic rheumatic arthritis contained in the Richmond Hospital Museum, to report to me his opinion on the appearances Mr. Soden's specimen presented; and he wrote to say, "that from the partial examination he could make of the preparation, he had only to remark, that the head of the humerus is considerably enlarged, and that the long tendon of the biceps, which has been dislocated internally, is in a state of atrophy." In those two last-mentioned additional circumstances, as well as in those previously noticed, the preparation resembles those of the shoulder-joints of Charles Maily.*

That the long tendon of the biceps should, under the influence of changes which the structures of the joint may have undergone from this disease, be thus thrown off the round head of the humerus, over which it arches, should not appear extraordinary, we have known similar displacements of tendons under analogous circumstances; for example, we generally found the extensor tendons of the fingers displaced

* These I have presented to the Museum of the Royal College of Surgeons in Dublin, and they have been preserved by Mr. Carte, the Curator. A statement of the case was laid before a meeting of the Pathological Society, during the Winter Session 1848-9, and the specimens were exhibited.

off the lower rounded extremity of the metacarpal bones, and the ligament of the patella and the patella itself are sometimes thrown over the outer condyle of the femur, when the knee-joint has been the seat of chronic rheumatic arthritis.

Although I have as yet said but little of any displacement of the head of the humerus, as a consequence of this disease, except in the direction upwards, yet I would now call attention to facts, to prove that the head of this bone, under the influence of the changes induced by it in the structures of the shoulder-joint, may suffer partial displacement in other directions, viz.: directly *inwards*, under the coracoid process; and lastly, directly *downwards*, on the axillary margin of the scapula. We shall first treat of partial displacement of the head of the humerus inwards, the result of chronic rheumatic arthritis.

I may observe that in the Museum of the College of Surgeons, Dublin, we find a specimen presented by Professor Hargrave, of *partial luxation inwards*, which he considers to have been the result of *accident*.

The accidental origin of the affection, however, cannot be proved, as the history of the case is unknown; and the specimen presents so many of the appearances which result from chronic rheumatic arthritis, combined with the partial luxation, that I

am of opinion that Professor Hargrave's specimen cannot be considered to have had an accidental origin, but that all the appearances it presents are the consequence of long-established chronic rheumatic arthritis. I shall here give an abstract of Professor Hargrave's case, referring for a fuller account to the Edinburgh Medical Journal.

“The capsular ligament presented a perfect state of integrity along the superior and posterior parts of the joints : it was dense and strong ; extending from the acromion process downwards and forwards towards the humerus. When the capsule was opened on its internal aspect, the head of the humerus was seen to be in part external to the joints, and was divided into two unequal portions by a deep groove extending for the entire length of its head in a perpendicular direction. Of these portions the internal and larger one passed a small distance beyond the corresponding edge of the glenoid cavity into the subscapular fossæ, while the posterior and smaller one remained in the cavity, occupying its internal surface. The groove now mentioned fitted on the inner edge of the cavity, which did not present its usual well-defined border, but was rounded off, so as to present a thick lip, from the constant pressure and frequent motion of the humerus upon it. The head of the humerus in its superior aspect was in close apposition with the coracoid process, and had altered in a remarkable degree its form, which, in place of being beaked and pointed, was much *expanded, flattened, and slightly hollowed*. When the articulation

was first opened, the tendon of the long head of the biceps could *not be seen* ; but on more particular examination it was found to have been *ruptured*, the portion connected with the muscle being intimately attached to the bicipital groove of the humerus, while the portion belonging to the glenoid cavity was much diminished in size, and presented a mere rudimental character in the capsular cavity.”*

When we carefully examine this specimen, we notice that it presents many of the general anatomical characters of chronic rheumatic arthritis, these appearances being of course modified as to the external shape of the surfaces by the special peculiarity of the partial displacement which had in this case occurred. The head of the humerus was much enlarged and misshapen ; it was found that a large portion of the new articular cavity for the head of the humerus, divided into two surfaces, articulated with both the new and old glenoid cavity. The effects of friction during the movements which took place between the bifid head of the humerus and the double articular cavity, which corresponded to it, were such, that perfect and complete eburnation of parts of the contiguous surfaces took place. This last circumstance could not be said in itself to amount to proof that chronic disease, rather than accident,

* See Catalogue of the Museum of the Royal College of Surgeons, Dublin, vol. II. p. 397 ; Edinburgh Medical and Surgical Journal for October, 1837.

had caused the partial luxation. But in addition to the ivory-like enamel, we find also that bony vegetations, or granular nodules of new bone, surround the outline of the new articular surface formed for the head of the humerus, and that small foreign bodies, like sesamoid bones, are seen bordering the edge of the articular cavity posteriorly. All these minor circumstances remind us of the anatomical characters we have found in examining cases of chronic rheumatic arthritis of the shoulder. The coracoid process, we are informed, had altered in a remarkable degree its form, which had become expanded, flattened, and slightly hollowed; in a word, it became articular, as we have before* found it to be, as the result of chronic rheumatic arthritis. The glenoid ligament was absent, and when the joint was opened, the long head of the biceps could not be seen; "it was found to have been ruptured," &c.

I have already made the remark, that when the shoulder-joint is the seat of chronic rheumatic arthritis, the neighbouring acromio-clavicular articulation is frequently affected with this disease. Now, in carefully examining Professor Hargrave's specimen we shall find that not only do the anatomical characters which belong to chronic rheumatic arthritis exist in this shoulder-joint, but also, that the acromio-clavicular articulation in the same specimen is enlarged externally; and that on examining it internally, it presents undoubted traces of

* See Atlas, Plate II.

this chronic rheumatic disease. Upon the other hand, I feel convinced that this specimen produced by Professor Hargrave as an example of a case of partial luxation inwards, the result of accident, does not really afford any proof that external injury was the cause of this partial luxation. In thus differing from Professor Hargrave, I would make the same remarks which I have already made in allusion to Sir A. Cooper's case, p. 126.

Partial displacement of the head of the humerus directly *downwards* has been observed to be the result of chronic rheumatic disease of long standing; but, after much diligent inquiry in museums and books, I can find but two well-marked specimens of this morbid change. The most remarkable of these specimens is a left scapulo-humeral articulation, which is contained in the Museum of the College of Surgeons, Dublin; the preparation formed part of the collection presented by Dr. Kirby to the College. The head of the left humerus in this specimen is greatly enlarged, and had descended much beneath its ordinary situation, and here a new glenoid cavity of a proportionate size had been formed on the axillary border of the scapula to receive it. The lower part of the old glenoid cavity was partially occupied by the enlarged head of the humerus, but the new addition to the cavity extends downwards for the space

of an inch and a half below its ordinary situation. The new glenoid cavity is enamelled upon its surface, and enlarged on its posterior margin by several irregular-shaped bones of new formation. The capsular ligament in this case has been partly ossified.* (Atlas, Plate IX. Fig. 7.)

If we look over the engravings in Sandifort's "Museum Anatomicum," we shall find a specimen of partial displacement of the head of the *humerus downwards*, which I have no doubt was the result of this chronic rheumatic disease. The writer of the Catalogue considers the specimen to have been the result of accident, and has appended a history to the case, giving an account of somewhat equivocal symptoms. Whether these symptoms, such as extensive effusion into the cavity of the joint, crepitus felt on the motions of the bones on each other,—were really the result of accident or disease, there is no proof adduced. When we carefully compare the engraving with what we have elsewhere seen of other specimens of this disease, we must, I think, come to the conclusion, that this example adduced by Sandifort must be considered as the result of chronic rheumatic arthritis of long standing, with partial displacement of the altered head of the *hu-*

* See Catalogue of the Museum of the College of Surgeons, Dublin, pp. 406, 905, &c.

merus downwards (Fig. 8). The acromion process (*c*) in this case had suffered the usual solution

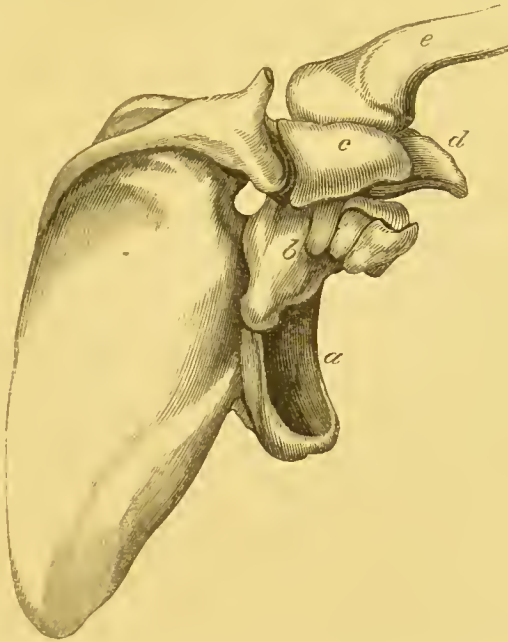


FIG. 8.

Right scapula, with a portion of the clavicle, viewed from behind. The head of the humerus had been partially displaced downwards: the result, most probably, of chronic rheumatic arthritis. *a*, Glenoid cavity. *b*, Portion of bone of new formation. *c*, Extremity of the acromion, and line of division between it and the rest of the process and the spine of the scapula. *d*, Anterior extremity of the coracoid process. *e*, Clavicle adhering to the extremity of the detached acromion. (*c*), Which "omnem motum claviculae sequatur."—SANDIFORT.

of continuity in the original line of junction of its epiphysis. There were also the additional portions of bone of new formation (Fig. 8, *b*) attached to the interior of the capsular ligament, and the enlargement and implication of the acromio-clavicular joint in the same morbid action with that of the shoulder. All these usual accompaniments of chronic rheumatic arthritis of the shoulder were observed in this case, and, together with the new osseous

margin beneath the ordinary level of the glenoid cavity (which are represented in G. Sandifort's engraving as large as nature*), are in a reduced form delineated here (Fig. 8).

The history of chronic rheumatic arthritis of the shoulder, notwithstanding the lengthened consideration I have here given to it, would be still very incomplete if I did not advert to some cases, which, though they may be rare, yet prove to us the possibility of this disease being found in combination with lesions of the joint of a totally different nature. For example, two of the most remarkable specimens of the effects of chronic rheumatic arthritis on the bones of both shoulder-joints I have seen are contained in the Museum of Bartholomew's Hospital. The account of them given in the Catalogue is as follows (pp. 108–132):

“The bones of both shoulder-joints of an adult: in each joint there has been ulceration, or such absorption as occurs in chronic rheumatism of the articular surface of the head of the humerus and of the glenoid cavity. The heads of the humeri are flattened and enlarged by growths of bone around their borders, and the glenoid cavities enlarged in a corresponding degree, and deepened, extend backwards and inwards to the basis of the spines of the scapulae. The articular surfaces, thus enlarged, are mutually adapted, and are hardened, perforated, and

* Sandifort, *Museum Anatomicum*, Vol. iv. Tab. 24, Fig. 2.

in some parts polished and ivory-like. The changes of structure are symmetrical, except in that the articular surfaces of the right shoulder-joint are more extensively polished than those of the left."

When I first examined this preparation in 1846, finding that the dislocation and other lesions mentioned existed in both shoulders, I at once concluded that accident could not have been the source of these remarkable abnormal appearances; and as I had already noticed displacements of the head of the humerus in other directions, as the result of chronic rheumatic arthritis, I did not then see any more rational means of accounting for these displacements and other organic changes, than by referring them, as indeed the learned editor of the Catalogue had done, to "such absorption as occurs in chronic rheumatism." However, subsequent observations and reflections, and a case adduced by Professor Smith, have convinced me that these two late specimens are examples of the case of congenital luxation of the head of the os humeri on the dorsum of the scapula, and that these same articulations ultimately became affected by chronic rheumatic arthritis. The luxations were congenital, but the hardening and ivory-like polish of the surfaces, and the growths of bone around the borders of the heads of the humeri are the effects of chronic rheumatic disease, which had supervened, perhaps, late in life, and were superadded to the congenital lesions of the articular structures.

Professor Smith has lately published a case in

which the combinations just referred to existed, and both shoulder-joints were affected. Although the history of this case was unknown, it can be easily deduced from the appearances that dislocation backwards of the heads of the ossa humeri existed at birth, and that late in life chronic rheumatic arthritis had been superadded. To quote the words of the author :*—

“ It will be sufficient to give a detailed account of one of the articulations, so closely did they resemble each other, both in external configuration and in anatomical characters. Upon the right side, the head of the humerus, placed much farther back than natural, and elevated so as to be in contact with the under surface of the acromion process, formed upon the dorsal region of the scapula a conspicuous tumour, which moved with the shaft of the bone. The acromion and coracoid processes, more especially the latter, were unusually prominent. The shoulder was flattened anteriorly, and the axis of the humerus passed somewhat inwards. On removing the deltoid muscle, and laying open the capsular ligament, it was found that no articular surface existed in the normal situation of the glenoid cavity, but upon the external or dorsal aspect of the neck of the scapula there had been formed a glenoid-shaped

* Professor Smith has not only the merit of having first made the Profession acquainted with the case of congenital dislocation of the head of the humerus backwards, but also that of first proving, as he has done by the case I am now adducing, that the congenital lesion may have grafted on it the chronic disease we are here describing.

concave surface for the reception of the head of the humerus; it measured two inches and a quarter in its vertical, and one inch and three-quarters in its

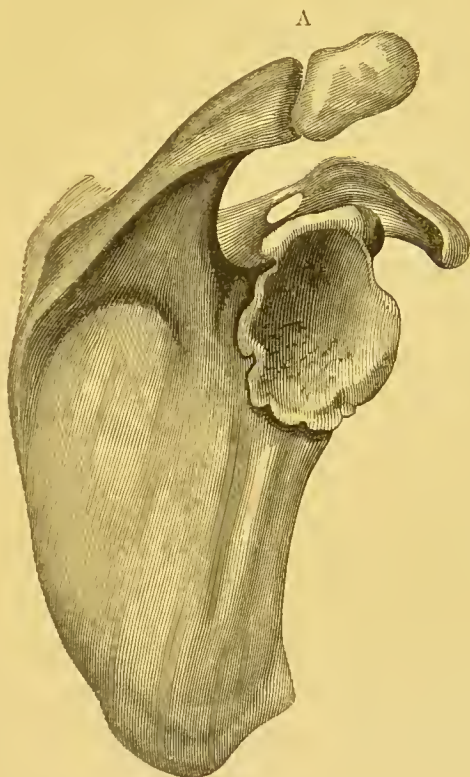


FIG. 9.

Right scapula, soft parts removed. Congenital luxation of the head of the humerus backwards had existed, and chronic rheumatic arthritis had been superadded. The acromion process presents the usual line of division (A) across it, like to a fracture. The two lesions, consisting in congenital malformation and superadded disease, existed in *both of the* shoulder-joints in this remarkable case.—See “*Dublin Quarterly Journal of Medical Science*,” February, 1853.

transverse diameter; totally destitute of cartilage, it was covered by a texture as hard and dense as enamel, and as smooth as polished ivory.

“The acromion process, about an inch from its anterior extremity, was divided into two portions,

the detached fragment rested upon the summit of the great tuberosity, and the solution of continuity corresponded to the sulcus which separates the tubercle from the head of the humerus. There was no deposition of bone along the line of separation, nor was there any displacement of the detached portion, which was closely connected with the remainder of the process by the fibrous tissues derived from the muscles which are here attached.

“A glenoid ligament, much broader than natural, surrounded the greater part of its margin; it adhered intimately to the capsular ligament, but had become in several places detached from the circumference of the socket.

“The tendon of the biceps muscle arose from the summit of the articular cavity; there was no interruption of continuity in any part of its course, but its intra-articular portion was remarkably short; it passed from its origin almost at once to the bicipital groove. At the point where it arose, however, from the glenoid cavity, its texture was unravelled, and its fibres separated from one another.

“The head of the humerus had completely lost the globular form which it possesses in the normal state; it was flattened from within outwards, and its axis appeared continuous with that of the shaft of the bone; its superior border was prolonged downwards, so as to conceal a portion of the anatomical neck of the humerus, between which and the elongated margin of the head there existed a deep sulcus or fissure, which was occupied by vascular productions from

the synovial membrane. The articular surface, the outline of which had become quadrilateral, was fully an inch broader than the socket in which it moves, and was smooth and polished to the same extent as the glenoid cavity. The lesser tuberosity was enlarged and had become articular, and irregular osseous growths surrounded the head of the bone.

“The tendons of the capsular muscles were perfect, with the exception of that of the subscapularis, the attachment of which to the rough and scabrous lesser tubercle had to a certain extent disappeared. The capsular ligament was somewhat thicker than natural.

“Upon the left side the condition of the articulation was similar to that just described as existing upon the right. In the form, situation, extent, and polish of the glenoid cavity; in the broad and partially detached glenoid ligament; in the unravelled condition of the tendon of the biceps at its origin; in the enlargement, flattening, and polish of the head of the humerus; its elevation to the acromion process; the nodulated state of its circumference; its prolongation downwards,—in all these respects there existed a perfect similarity between the two articulations. There was also upon both sides an osseous growth from the margins of the bicipital grooves, by which their depth was increased.

“Upon the left side, however, the acromion process was perfect, but the surface for articulation with the clavicle was enlarged. Upon this side, also, osseous depositions had taken place in the capsular ligament,

near its attachment to the inner margin of the glenoid cavity." Professor Smith adds:—

"It must, I think, be obvious to those acquainted with the external signs and anatomical characters of congenital luxations of the shoulder backwards, and who are also familiar with the morbid appearances which chronic rheumatic arthritis presents when established in this articulation,—that in these remarkable specimens two distinct classes of phenomena existed: the one manifestly indicating original malformation; the other as clearly denoting the super-addition of a disease of a peculiar character. To the former belong the absence of any vestige of a glenoid cavity ever having existed in the situation which it naturally occupies; the accurate resemblance to one another of the abnormal sockets in position, shape, and dimensions; the shortness of the intra-articular portions of the bicipital tendons; and the existence of glenoid ligaments. These phenomena indicate, in my opinion, that the deformities originated neither in disease nor accident; and when I compare them with those observed in the case of double congenital subacromial luxation, elsewhere described by me,* I feel more strongly convinced that in the rare and remarkable case just described, the malformations were also congenital.

"Among the appearances which demonstrate that chronic arthritis had long existed in each of these malformed joints, are to be placed the removal of

* "Fractures in the Vicinity of Joints," p. 206.

the articular cartilages; the enamelling of the osseous surfaces thus exposed; the bony growths around the bases of the heads of the humeri; the deposition of bone in the capsule; the unravelling of the fibres of the bicipital tendons; the growth of the numerous vascular bunches of synovial fimbriæ; and the solution of continuity in the acromion process.

“In confirmation of this view of the case it may be mentioned, that in the body of the person in whom these specimens were found, all the fingers and toes were webbed, and that one of the hip-joints presented a well-marked example of chronic rheumatic arthritis, evidenced by the disappearance of the ligamentum teres; the removal of the articular cartilage; the existence of an ivory-like deposit; and, finally, by shortening of the neck of the femur, and an alteration in the angle which it naturally forms with the shaft.”*

We need not, in my opinion, be much surprised to find that chronic disease should become engrafted on the articular structures of shoulder-joints in which congenital malformations existed, because we can readily conceive that if any latent disposition to chronic rheumatic arthritis existed in the constitution, the exercise of a joint which had been imperfectly formed by nature should be very likely

* “*Dublin Quarterly Journal of Medical Science*,” February, 1853.

to give rise to this disease, which is often the result of over-work, even in well-formed articulations.

Analogous to the circumstances of this peculiar disease being superadded to an originally malformed shoulder-joint, is the case which has been witnessed of chronic rheumatic arthritis arising in the structures of a shoulder-joint which had been dislocated and left unreduced. For example, Dr. Power, the Professor of Anatomy to the Royal College of Surgeons, laid before the Pathological, and also before the Surgical Society, on the 17th of December, 1853, a case of unreduced dislocation of the head of the humerus into the axilla,* in which case, on dissection, besides the ordinary anatomical characters which belong to such a lesion, there were superadded those that specially characterize the disease called chronic rheumatic arthritis.

In this case, it is presumed that the chronic diseased condition of the joint *succeeded* to the luxation, but experience has taught us to be alive to the possibility of a patient while labouring under this chronic disease in the shoulder-joint becoming the subject of an accidental luxation of the articulation; that in one case at least this has occurred, we find strongly, and, in my opinion, successfully argued by Professor Smith, although the eminent surgeon who has published the case in question had not taken the same view of the matter. The following are Professor Smith's observations:—

* See Medical Press, January 18, 1854.

“ In the fifth volume of Guy’s Hospital Reports Mr. Hilton has published a case of dislocation of the right humerus into the axilla, with an account of the dissection of the parts, thirteen weeks after the accident.” “ The luxation was easily reduced, but great difficulty was subsequently experienced in maintaining the head of the bone in its proper position. The patient died of disease of the chest thirteen weeks after the accident.

“ The external form of the joint resembled very much the configuration of a shoulder which had been the subject of ulceration, or rupture of the tendon of the long head of the biceps, or what is termed the partial dislocation inwards of the humerus. The roundness of the shoulder was diminished, as compared with that of the opposite side; the acromion and coracoid processes were very distinct; the head of the humerus was elevated to the acromion; the posterior surface of the joint flattened, and the deltoid muscle atrophied.

“ On dividing the attenuated deltoid transversely, and retroverting it, the head of the humerus was immediately brought into view, uncovered by its capsule, and without its greater tubercle, which had been broken off. A portion of the capsule, with the greater tubercle of the humerus attached to it, was found interposed between the articular surfaces of the humerus and the scapula. Two considerable openings existed in the capsule. The upper, somewhat circular in outline, was nearly an inch in diameter, and its edges were much thinned and well-

defined; this opening corresponded with the surface of extreme pressure between the humerus and scapula. The lower opening was opposite the inferior edge of the glenoid cavity; it was angular in outline, and its edges were thick and irregular. Through this opening the head of the humerus escaped at the time of the accident.

“The greater tubercle of the humerus had become retracted by its muscles with the capsular ligament, towards the outer part of the glenoid cavity. The tendon of the long head of the biceps had been separated from its origin at the scapula, and divided vertically into two portions; one of them had become fixed to the inner edge of the bicipital groove; the other had acquired an adhesion to the tubercle of the humerus in its new position, and encircled the outer half of the neck of the humerus.”*

The following are Professor Smith's comments on this case:—

“To any one who reflects for a moment upon the description given by the author of this interesting case, it must be apparent that two classes of phenomena existed, distinct in their nature, and originating in causes essentially different; one, produced by the injury which occurred thirteen weeks before the death of the patient; the other, resulting from the pre-existence of chronic rheumatic arthritis.

“The results of the recent injury were, the angular rent in the lower part of the capsule, through which

* *Loc. cit.*

the head of the bone had passed into the axilla; the fracture of the greater tubercle of the humerus, and the interposition of the capsule between the articular surfaces of the humerus and scapula; while to the effects of pre-existing disease are to be ascribed—the circular aperture in the upper part of the capsule; the detachment of the tendon of the biceps from the glenoid cavity; its adhesion to the bicipital groove and adjoining portion of the tuberosity; the disappearance of its intra-articular portion; and the contact of the head of the bone with the deltoid muscle, and with the acromion and coracoid processes and coraco-acromion ligament.

“ The splitting of the remains of the tendon of the biceps was, I conceive, an effect of the injury; the broken tubercle, retracted by the muscles attached to it, drawing forcibly with it that portion of the tendon which previous disease had rendered adherent to it, where it forms the outer margin of the bicipital groove. It is obvious that the circular aperture in the upper part of the capsule could not have been the result of absorption from pressure exercised upon it *after* the receipt of the injury; for it is distinctly mentioned that great difficulty was experienced in maintaining the head of the bone in its natural position; that it had a constant disposition to fall again into the axilla, almost by its own weight; and that the action of three of the capsular muscles was annulled by the fracture of the great tubercle. Under these circumstances, it is impossible to believe, with the author, that ‘ the pressure of the humerus upon

the capsular ligament had induced its progressive attenuation and absorption,' *after* the receipt of the injury. The case must, therefore, in my opinion, be considered as an example of dislocation and fracture occurring in a joint previously the seat of chronic rheumatic arthritis."*

In concluding the account of chronic rheumatic arthritis of the hip and shoulder, it may prove not uninteresting here to compare the anatomical characters of this disease, as they present themselves in the articular textures of the hip, with those which the dissection of a shoulder-joint that had been affected with the same disease exhibit. For example, first, one of the most remarkable lesions noticed as the result of this chronic disease having existed in the hip-joint is, the loss of "the round ligament" which normally connects the head of the femur to the interior of the acetabulum. This ligament, we know, has its representative in the shoulder-joint in the long tendon of the biceps, and this tendon, when the latter joint has been affected by this disease, is very generally removed, just as the round ligament is when the hip-joint has been the seat of this peculiar affection.

Secondly. Whether it be the hip or shoulder-joint which has been thus diseased, it will be found that the capsular ligament belonging to the joint is hy-

* Dublin Quarterly Journal, February, 1853, p. 15.

pertrophied, and that highly developed synovial fibrinæ exist in the interior of the synovial sacs equally in both articulations.

Thirdly. There is an enlargement and eburnation of the articular surfaces in both cases, as well as an exuberant growth of bone surrounding the corona of the head of the femur in the one, and the circumference of the articular surface of the head of the humerus in the other: these similar *morbid* appearances, as exhibited by the post-mortem examinations made of the hip and shoulder-joints, which had been affected by chronic rheumatic arthritis, show an identity as to the nature of the morbid actions they have been subjected to.

And as to a correspondence in the *symptoms* of this disease as it affects both articulations, we may make similar observations. For instance, the peculiar nature of the pain; the stiffness of the joint when first moved in the morning, and the subsequent improvement under exercise during the course of the day; the sub-inflammatory condition of the joint, which impairs, but does not altogether impede its use, and which I have never known proceed, in either articulation, to suppuration or to ankylosis. In a word, all these are the special symptoms and anatomical characters of one and the same disease, as it affects in a similar manner the hip and shoulder-joints respectively.

The history of chronic rheumatic arthritis of the elbow and knee, the wrist and ankle, as well as of all the smaller articulations of the region of the hand and foot, shall next, successively, engage our attention, and be followed by an account of this disease as it manifests itself in the temporo-maxillary articulations, in those of the clavicle, and, finally, in those of the spinal column.

CHAPTER III.

THE DISEASE IN THE ELBOW.

WHEN the elbow-joint is the seat of this peculiar affection, it is seldom found to be a local disease. The opposite elbow, as well as many of the other articulations of the patient, are usually symmetrically implicated.

SYMPTOMS.

The first symptoms the patient complains of are usually confounded with those of ordinary rheumatism ; soon the joint become somewhat hot and swollen ; its ordinary movements, whether of flexion, extension, or rotation, become restricted within very narrow limits, and when we attempt to communicate any of these motions, a crepitation of rubbing surfaces is perceived.

In the early stages of this disease the synovial sac of the elbow-joint is much distended with fluid, but after a time this redundant quantity diminishes, and at length there would seem to be even a deficiency of the normal secretion. In many of these cases of

chronic disease of this articulation, I have observed that around the joint, bursæ, which had not normally existed before, become developed during the progress of the disease, and into the subcutaneous bursa, which exists normally behind the olecranon process, an effusion of an inordinate quantity of synovial fluid takes place.

ANATOMICAL CHARACTERS.

The abnormal appearances produced by this disease as it affects the elbow-joint, discovered by our anatomical investigations, are various. I have observed the bones forming this joint in elderly persons, who have long suffered under the constitutional form of this disease, remarkably light and porous, and in a state of atrophy. In other cases, on the contrary, where the disease had assumed the local form, I have found them enlarged and hypertrophied (see Atlas, Plate iv. Fig. 4). The cartilage of incrustation, in either case, is always removed; in some, the porous or cellular structure of the bones is exposed, and in others it is covered with a porcelain-like enamel. The trochlea of the humerus and corresponding surface of the great sigmoid cavity of the ulna are marked by parallel ridges and grooves in the line of flexion and extension, and the edges of the articular surfaces are generally studded all round with bony nodules and vegetations.

The superior extremity of the ulna I have found in some of these cases greatly hypertrophied, and

having besides attached to the edges of the articular surfaces osseous growths of the class I have denominated *additamentary* bones, analogous to those which we have noticed in other articulations (see Plate IX. Fig. 7, D), affected with chronic rheumatic arthritis.

We have in the Museum of the Richmond Hospital an example of an elbow-joint, which had been affected with chronic rheumatic disease of the local form, of which a cast having been taken, the bones were subsequently, by dissection and maceration, denuded of all their coverings; these preparations are delineated in Atlas, Plate IV. Figs. 4 and 5. The account of the bones given in the Catalogue is as follows:—"This preparation shows the effects of chronic rheumatic arthritis of the bones composing the articulation of the elbow. The bones are very much hypertrophied, and their articulating extremities altered in form and size; a great number of foreign bodies (some cartilaginous, some bony) existed in the articulation. The synovial membrane was intensely vascular. A number of vascular fimbriæ projected from it into the interior of the joint. The bursæ in the vicinity of the articulation were enlarged."

The sigmoid cavity of the ulna in this remarkable specimen is enormously enlarged; bony nodules and vegetations surround the edges of the articular cavity. The enlarged olecranon process, being twice its normal size, was found to have been completely severed from the rest of the ulna by a transverse line

of division, which ran across the middle of the great sigmoid cavity, yet the portions thus severed (so far as the bone was concerned) were still held in such juxtaposition by the surrounding structures, that it was only on close anatomical examination it was known that a real separation between them existed.

This circumstance reminds me much of the condition the aeromion process is frequently found in, when the shoulder-joint has been the seat of this peculiar disease. I may here mention, that I once had an opportunity of seeing, among a collection of diseased bones contained in the Museum of Guy's Hospital, a specimen of an ulna which bore the traces of chronic rheumatic arthritis in its great sigmoid cavity; and on the front of this last was seen the coronoid process, much hypertrophied, and severed at its root, yet still held in exact juxtaposition with the ulna.

These solutions of continuity between the shaft of the ulna and its processes evidently did not arise from any accidental lesion, such as a fracture. The opposed surfaces of the separated portions of bone, though held close to each other by fibrous structures, presented no sign of any process of bony union having been attempted; no ossific deposits, nor osseous growths, existed, which should have been the case if any fracture had occurred.

The cause of the solution of continuity in these cases between the shaft of the ulna and its processes, above mentioned, becomes a question well worthy of inquiry, but one to which, in the present state of

our knowledge, I imagine no satisfactory answer can be given; we must only suppose that the separation occurs in obedience to the same law which under analogous circumstances of disease we find effecting a complete division into two portions of the acromion process, a lesion we have already dwelt on in the preceding chapter. Hereafter, when describing the varied anatomical characters of chronic rheumatic arthritis of the knee and also of the wrist-joint, I shall have to refer to analogous organic changes observed in the detachment of the tubercle of the tibia from the body of this bone, as well as of that of the styloid process, from the lower extremity of the ulna, singular lesions, we have observed to be the result of this peculiar disease. It is very remarkable that in almost all of these examples the detached processes have been observed to have been much hypertrophied.

The appearances the *radio-humeral portion* of this articulation presents under the influence of this disease also deserve consideration here. For example, in many cases the head of the radius becomes greatly enlarged, and assumes quite a globular form, while the anterior and outer part of the lower extremity of the humerus will have its capitulum or convex head not merely rendered plane, but here the humerus will be found to have become even excavated so as to receive the globular-shaped head of the radius, and to accommodate itself to the abnormal form this last has acquired from disease (Plate iv. Fig. 3, c). In many cases where the radius had become

thus enlarged, and of a globular form, I have found the cartilage removed altogether, and its place occupied by an ivory-like enamel. In two examples I have seen a depression or dimple in this orbicular-shaped head of the radius, similar to what naturally exists in the head of the femur; and in these two cases, strange to relate, a distinct bundle of ligamentous fibres, analogous to the round ligament of the femur, passed from the dimple, or depression alluded to, connecting this head of the radius to the back part of the sigmoid cavity of the ulna (see Atlas, Plate iv. Fig. 3).

In other instances the head of the radius is otherwise altered from its natural form; the superior articular extremity of this bone has been found excavated from side to side; its outline not being circular but ovoidal, accurately representing, on a small scale, the glenoid cavity of the scapula (see Atlas, Plate iv. Figs. 1 and 2).

I may here remark, that I had a patient, aged 60, under my care in the House of Industry, who had for many years suffered under the severest form of chronic rheumatic arthritis in all his articulations. I had noted in particular the condition of the right elbow-joint: the fore-arm remained habitually in a middle state between pronation and supination, rotation was impossible; and the motions of flexion and extension were very limited, attended with crepitation, and this exercise caused the patient to suffer much pain. This man died of a complaint unconnected with this chronic disease, and upon making a

post-mortem examination of the right elbow-joint, we observed the glenoid form of the head of the radius and condition of the bones above described (see Plate iv. Fig. 2). The loss of the circular outline of the head of the radius fully accounted for what we had in this case previously noted, viz.: that to remove the hand from the medium state between pronation and supination in which it habitually remained, or to communicate any movement of rotation to it, was impracticable. The glenoid-shaped surface of the head of this bone in this case admitted only of limited flexion and extension in the radio-humeral joint.

I possess a specimen, the result of this disease (Atlas, Plate iv. Fig. 1), in which the head and upper part of the shaft of the radius are much hypertrophied; the superior articular surface presents an oval form, its long axis being nearly two inches in extent. This bone must have habitually remained in a middle state between pronation and supination, and the direction of the minute ridges and grooves, noticed on the eburnated articular surface, sufficiently indicate that the movements of the fore-arm on the arm in this individual must have been limited to those of flexion and extension, the fore-arm being all the while in a middle state between pronation and supination.

Besides this alteration in the form of the head of the radius under the influence of this disease into the globular and ovoidal figure, I have also to observe, that I have met with a specimen in which the

head of this bone was greatly enlarged, and at the same time its superior articular extremity presented a surface nearly plane, with a *quadrilateral* outline. The articular surface corresponding to that of the humerus was covered with a well-marked porcelainous deposit, remarkably white, and highly polished.

The globular and ovoidal form which the head of this bone, under the above-mentioned circumstances, assumes with its enlargement and porcelainoid deposit, are well seen in preparations contained in our Museum (Plate iv.); and the very remarkable specimen of the quadrilateral shape with enlargement of the head of the bone, &c., &c., I have also alluded to, will be found in the ample collection of diseased bones contained in the Sandifort Museum at Leyden.*

FOREIGN BODIES IN THE ELBOW-JOINT.

In most of the cases I have examined, I have discovered what are called "foreign bodies or pendulous bodies" in the cavity of the joint. These I have found of all sizes, from that of a pea to that of a walnut. Some were seen hanging into the cavity of the articulation, suspended by white slender membranous threads, which seemed to be productions from the synovial sac; and some were loose in the joint; while, as to their structure, some were

* See also Index, case of M'Garry.

cartilaginous and others bony. The number of these foreign bodies I have seen in the cavity of the elbow-joint, I confess, has astonished me, amounting, in one case, to twenty, in another to forty-five (Atlas, Plate v.).

In all these cases there seems to be a very active circulation of blood in the capillary vessels of the bones and other structures of the joint; much of the synovial membrane may be removed with the cartilages, but the synovial folds and fimbriæ which encircle the neck of the radius are found to be in a highly vascular and congested condition.

Lastly, instead of the few scattered fibres external to the synovial sac, which in this joint, when in a normal state, can scarcely be said to resemble even the rudiment of a fibrous capsule, I have found in these morbid specimens the thickness and number of ligamentous fibres so considerable, that the joint seemed to possess almost a complete capsular ligament.

In Cruveilhier's "Pathological Anatomy," Livraison No. 9, Plate vi. Fig. 1, there is a graphic delineation of an elbow, illustrating many of the points here alluded to. He styles the disease "*usure des cartilages articulaires*," a denomination I have already objected to, because I feel assured that the disease does not confine itself to the cartilages of the joint, but that the articular heads of the bones are also engaged; indeed, in many of our specimens the bones of the elbow-joint are so much enlarged as to resemble, at first sight, the knee-joint; the shafts also of

the ulna and radius (Atlas, Plate IV. Fig. 4, B, C,) are heavier and harder than natural, and their cancellated structure no longer exists, the cells being so densely penetrated with phosphate of lime, that the sections of these bones in several parts present the appearance of ivory.

CHAPTER IV.

THE DISEASE IN THE KNEE.

THE commencement of this chronic disease in the knee-joint is marked by the usual signs of subacute inflammation of the synovial membrane, such as pain, heat, and swelling. The pain is usually referred to the inner condyle of the femur and tibia, and is not very severe, so that during the early period of the disease the patient can walk much without inconvenience; but from year to year the stiffness and uneasiness felt in the joints gradually increase; while the knees are swollen and enlarged, the muscles of the thigh and leg diminish somewhat in size; still, when examined with the hand, they feel firm. The tendons of the hamstring muscles become tense, and in many cases the power of either fully flexing or extending the joints is lost. Indeed, in some instances, the patient becomes, from the gradual increase of these symptoms, incapable of walking, or even standing without assistance. The knee-joint, from the commencement of the disease, is noticed to have a strong inclination inwards, and this appear-

anee becomes the more remarkable when both articulations are symmetrically affected. The bones of the leg are usually rotated on their long axis outwards, so that the foot is everted. Now, if the limb be kept habitually in the semiflexed position (as in those who are bedridden in consequence of this disease), and the tibia be, as above described, rotated outwards, of necessity carrying with it the ligamentum patellæ, it becomes easy to account for the circumstance, which, in the advanced stage, is occasionally to be noticed, namely, that the patella may rest on the front of the outer condyle of the femur, or may be even thrown entirely to the outside of this condyle,* as it is in the ordinary luxation outwards of this bone produced by accident.

The disease, in its early stage, is manifestly a chronic synovitis, and the effusion which accompanies the subinflammatory action gradually increases in quantity.

When the distention of the synovial sac is at its maximum, we occasionally notice, besides the very considerable soft fluctuating tumour in front of the knee-joint, elevating the patella, that there is at the same time a similar fluctuating tumour, about the size of a hen-egg, projecting posteriorly into the popliteal region (Plate IX. Fig. 1, B). This tumour leans towards the inner head of the gastrocnemius; it disappears when the knee is flexed, and becomes more tense and hard when the limb is in the ex-

* See case of Mrs. Cassidy.

tended position, as when the patient stands erect. I have known many cases of this disease thus affecting the knee-joint, in which the synovial sac of this articulation had been much distended with fluid. In most of these cases the popliteal swelling existed, and in a few instances opportunities were afforded me of ascertaining by dissection that the smaller swelling projecting towards the popliteal space was formed by the over-distention of a normal bursa which freely communicated with the interior of the larger synovial sac of the joint (see Atlas, Plate ix. Fig. 8, A). When the palm of the hand is applied over the patella, in the early stages of the affection, a sensation of a preternatural degree of heat is felt; and when pressure is made on the patella, and a lateral movement across the condyles is communicated to it, a very evident roughness is perceived, either on the articular surface of the patella itself, or the corresponding surface of the trochlea of the femur, or both; and when the knee-joint is alternately flexed and extended, a characteristic articular crepitus becomes manifest. In the later stages of the disease, the subacute inflammation, with the phenomena which it presents, subsides; the synovial fluid becomes absorbed, and the patella falls back on the trochlea of the femur; the popliteal bursa also disappears, but the grating produced by rubbing surfaces becomes more evident; it is perceived by the patient himself in all his movements, and can even be heard by the bystanders.

If at this period the surgeon make a careful examination of the joint, he will first notice that the

patella is *broader* than natural, and crests and ossific depositions can be felt in different points of the femur and tibia.

Besides, he can very frequently detect the existence of foreign bodies in the interior of the joint. Some of these foreign bodies seem superficial, small, and moveable, and give us the idea that they are attached by a pedicle to bone (see Plate VIII. Fig. 2, B). Others are large, and seem situated more deeply in the joint.

DIAGNOSIS.

Although this chronic disease of the knee-joint is accompanied by the ordinary symptoms of a subacute arthritis, the constitution of the patient is but little disturbed by it; the affected limb is at first capable of extension and flexion, the patient can walk long distances without suffering much inconvenience, except a temporary increase of stiffness of the joint. He does not complain of spasmodic startings of the limb, and when the ordinary experiment is tried, of percussing the heel so as suddenly to direct the condyle of the tibia with force against the lower articular surface of the femur, he suffers no pain. Thus we learn, that the disease differs from that wearing disease, ulceration of the cartilages of the knee-joint, which, in the end, so frequently demands amputation.

The disease of the knee-joint, familiarly called white swelling, is sometimes unaccompanied with pain, the patient at first being able to walk about, and the constitution remains undisturbed; but the local ap-

pearance in white swelling and chronic rheumatic arthritis of the knee is very different. In the former there is much wasting of the limb above and below the affected joint; the swelling is not well defined; it is elastic, with a degree of firmness. In the chronic rheumatic case, during the early stage, when swelling exists, it is soft and fluctuating, and evidently consists in an effusion into the synovial sac of the joint.

The soft cellular membrane around the synovial sac, and behind the tendon or ligament of the patella, does not become infiltrated in the chronic rheumatic case, as it does in white swelling. On the contrary, in the chronic rheumatic affection of the knee-joint, the tendon or ligament of the patella stands out quite distinct, and presents its normal appearance where it is inserted into the tuberosity of the tibia (see Atlas, Plate IX. Fig. 1, E).

The peculiar crackling sound elicited on any movement being communicated to the knee-joint,—the rising crests and rims of bone which can be felt bordering the edges of the trochlea of the patella and the *margins* of the femoral condyles,—the enlargement and increased breadth of the bones, particularly of the patella,—all these characters, found combined in any given case of an affection of the knee, sufficiently point it out as an example of chronic rheumatic arthritis.

ANATOMICAL CHARACTERS.

SYNOVIAL MEMBRANE.—When the opportunity is afforded to us of making an anatomical examination of a knee-joint in which this disease had existed in an early stage, we find the synovial sac to be much dilated, somewhat thickened, and to contain an inordinate quantity of synovia. When this is removed, the inner surface of the synovial sac is generally found to be of a highly red colour, and to resemble somewhat an inflamed conjunctiva; the synovial fimbriæ are much developed, and in a state of vascular congestion.

On examining the popliteal tumour, which we have above adverted to, in detailing the symptoms of this disease of the knee, we find it to consist in an enlargement (from distention by the synovial fluid) of the bursa, which normally exists at the point of decussation of the semi-membranous tendon with the tendon of the internal head of the gastrocnemius. This bursa usually communicates in the normal state with the larger synovial sac of the joint, and by a very small circular aperture; and when, under the influence of this disease, the synovial sac of the knee-joint becomes distended with fluid, this neighbouring popliteal bursa also becomes swollen.

I have had opportunities of examining cases of this kind anatomically; and when I have inspected the interior of some of the over-distended popliteal bursæ above alluded to, I have noticed that this little

offset of the general synovial sac of the knee did not form one uniform ovoid cavity, but that it had semi-lunar septa thrown partially across its interior, thus rendering the bursa a small multilocular cavity (see Atlas, Plate IX. Fig. 8, A). In the ordinary course of this disease, the redundant quantity of fluid is absorbed, and the popliteal tumour disappears. I have found, on making the post-mortem examination of one of these cases, the obliterated popliteal bursa to have its walls converted into a small white solid tumour, about the size and shape of an almond.*

HYPERTROPHIED SYNOVIAL FIMBRILÆ, PENDULOUS EXCRESCENCES.—Besides the uniform redness and congestion of the synovial membrane of the knee, as already mentioned, we must not omit to draw attention here to a vascular and hypertrophied condition of the synovial fimbriæ, found to exist in knee-joints which had been affected with chronic rheumatic arthritis. These fimbriæ have not escaped all notice hitherto, but they have not—except by very few—been adverted to as appearances specially belonging to the anatomical signs of the chronic disease we are here considering.

Cruveilhier, in giving an account of the dissection of a knee-joint in which were noticed those appearances we are now familiar with as the ordinary effects of chronic rheumatic arthritis, such, for example, as eburnation of the articular cartilage, &c., adds: There existed also in the interior of this arti-

* See case of M. Donohoe.

culation "une multitude des franges synoviales tres developées et rouges."*

Other pathologists have alluded to analogous productions from the interior of the synovial membrane of the knee and other joints ; and if we carefully analyze, as far as can be done, their observations, I think the morbid productions adverted to will be found to have occurred in individuals who had been during their lifetime affected with chronic rheumatic arthritis.

To prove this last point, however, I feel obliged here to enter somewhat into detail.

Sir Benjamin Brodie, in the *third edition* of his work on the "Diseases of the Joints," has drawn attention to the fact, that in some rare cases "pendulous excrescences" are produced from the interior surface of the knee-joint ; he gives the following account of these cases :

"In the Museum of St. George's Hospital there is a specimen of a knee-joint, the inner surface of which is lined by a great number of small pendulous excrescences, connected with the synovial membrane, having a smooth external surface, and bearing an apparent resemblance to the *appendices epiploicæ* of the great intestine, though not, like them, containing adipose substance.

"The preparation was purchased at the sale of the late Mr. Heaviside's anatomical collection, and nothing is known of the history of the patient from

* Cruveilhier, "Anatomie Pathologique," Liv. IX p. 14.

whom it was taken. We have another somewhat similar specimen; and in the last case there is reason to believe that the excrescences were the result of long-continued *inflammation of the synovial membrane*. A third example of the same disease is in Sir Charles Bell's Museum, which was formerly in Great Windmill-street. The late Mr. Shaw informed me, that in this case, the joint contained a considerable quantity of whey-like fluid; but he was not able to give me any further information respecting it.*

The late Mr. Herbert Mayo,† also observes, that, "The synovial membrane lining the capsular ligament of the knee-joint has been found covered *with innumerable little processes, something like melon-seeds* in shape and colour, some larger, others smaller, pendulous into the cavity of the joint." Of this affection, he says he has himself met with but one instance.

The case he alluded to, in which the above-mentioned morbid appearance existed, was that of a man between thirty and forty years of age, who had suffered for several years with occasional attacks of what was considered *rheumatic gout in the knee*, that is to say, with pain, swelling, and weakness. After a time these symptoms would get better, but the knee always remained a little enlarged. The patient died of the effects of an inguinal aneurism, and the appearances above described were found on making a post-mortem examination of the knee-joint, in which

* On "Diseases of the Joints," by Sir Benjamin Brodie, p. 280. Third Edition, 1836.

† "Outlines of Pathology," p. 105 1836.

he had suffered the occasional attacks of pain, swelling and weakness.

We learn that Baron Dupuytren many years ago made the anatomical examination of the knee-joint of a criminal, who, having been executed in Paris, was immediately afterwards transferred to the Laboratory of Anatomy of the Faculty of Medicine. The integuments covering both knees were quite in a natural state, but the joints were greatly tumefied. The swellings, on external examination, gave to the touch a distinct feeling of fluctuation. On making incisions into the joints, there flowed out of one twelve, and from the other thirteen, ounces of fluid, which was viscid and tenacious, and although of a somewhat reddish hue, was transparent, having a peculiar odour, a taste somewhat saline; its specific gravity was as to that of distilled water as 105 to 100. The synovial capsules were thicker than natural, and presented *everywhere on their internal surfaces a number of little soft productions* (pelotons d'apparenee celluleuse), of various forms and sizes, which were attached by means of narrow pedicles to the interior of the synovial membrane of the knee, whose surface everywhere presented a remarkably red colour.*

Rokitansky has also minutely described these pedunculated bodies in the following words:—

“Specimens are to be met with in nearly every collection of large joints (especially knee-joints) in

* “Dictionnaire des Sciences Medicales,” tom. xxii. p. 148.

which the capsule is enlarged and thickened, and its inner surface covered with white shreds of various length, which are occasionally so numerous that the joint seems as if it were lined with felt; sometimes the shreds are simple, smooth, rounded, or rather flattened threads; or they here and there form a membranous patch upon the surface, or have their free extremities split into filaments, and resembling a tassel. In extreme cases, *small, smooth, and subovate bodies, which Mayo compares to melon-seeds*, are attached to their extremities, hanging singly or in clusters from each stalk: and lastly, here and there amongst them shapeless masses are attached by broader bases. They all have a fibrous or fibroid texture, and are of innocent character, having nothing in common with the cystic and cancerous productions which are found on normal or anomalous serous membranes.”*

It is clear, then, that very many eminent observers had noticed these growths from the synovial membrane of the knee and other joints, but so far as we have yet adverted to the accounts they have given of them, we do not find that they have positively referred them to any special category of disease, but have considered them, as Sir Benjamin Brodie would seem to have done (in all but in the fifth edition of his work on the Joints), as the simple effect of “*long-continued inflammation of the synovial membrane.*”

* “Pathological Anatomy,” by Carl Rokitansky, M. D. Sydenham Society’s Transactions, vol. III. p. 289.

I must say I had long looked upon such appearances as the result of the disease it is the object of this work to describe, and therefore I was glad in 1847 to avail myself of an opportunity of examining the preparations alluded to, as contained in the Museum of St. George's Hospital, particularly that which had belonged to Mr. Heaviside's collection; and I observed, that besides the "exerescences" above alluded to as hanging from the synovial membrane into the interior of the knee-joint in this preparation, there were also very decided evidences of the joint having been during the lifetime of the patient the seat of chronic rheumatic arthritis. The cartilages had been absorbed, and here and there porcelanoid deposits, with grooves in the line of flexion and extension of the joint, existed.

Although Mayo also considers the case he has adduced as an example simply of long-continued inflammation of the synovial membrane, still, if we look to the history he has himself given of it, we shall find that his patient had long suffered from occasional attacks of rheumatic gout.

As to the case adduced by Dupuytren as one of "hydrops articuli," I have merely to observe, that we know this to be a term signifying that there is an inordinate quantity of synovial fluid effused into the sac of the joint. We also know such an effusion to be a constant symptom of the earlier stages of chronic rheumatic arthritis, the disease which, I have no doubt, existed in this case. I am induced to come to this last conclusion, not only from the appearances

displayed by the dissection, but also because that both knee-joints were, as is usual in such cases, symmetrically affected.

Lastly, that these hypertrophied synovial fimbriæ, as well as "subovate bodies, like melon-seeds," should be considered as appearances, the special result of rheumatic gout, that is to say, of chronic rheumatic arthritis, would seem to be now finally settled by the additional evidence of the following case, adduced by Sir Benjamin Brodie in the *fifth* and *latest* edition of his work on the "Joints:"—

CASE XII.

"A woman, who for many years had suffered from rheumatism, affecting especially the knees, was admitted into St. George's Hospital, under the care of Dr. Chambers, on account of a pulmonary disease, from the effects of which she died. On examining the body after death, the synovial membrane of the right knee was found to be dilated, much thickened, and preternaturally vascular, the inner surface of it being lined by a great number of excrescences, somewhat resembling in appearance the *appendices epiploicæ* of the great intestine, but of a smaller size. These presented a smooth membranous surface externally, but on being cut into were found to consist of condensed cellular membrane and fat. The cartilage of the external condyle of the femur had wholly disappeared, and in its place a solid bony

matter had been deposited, not unlike ivory in colour and consistence. The bone at this part had a grooved appearance, as if worn by the friction of the patella. The cartilage of the inner condyle was altered in structure, being softer than natural, at the same time that it presented an indented or corrugated appearance on its surface. The patella was wholly deprived of cartilage, the exposed surface of the bone being of a hard and compact texture, and exhibiting distinct indications of its having been worn by friction on the external condyle of the femur. The left knee was diseased nearly in the same manner as the right, and both knees were much enlarged, the enlargement being the result partly of the thickened condition of the synovial membranes, partly of an opaque serum, collected in the articular cavities.”*

FOREIGN BODIES IN THE KNEE-JOINT.

We have said that loose cartilages, or “foreign bodies,” sometimes exist in the knee-joints of patients afflicted with chronic rheumatic arthritis of these articulations, that occasionally they can be felt through the integuments during the lifetime of the patient in great numbers, and that on making post-mortem examinations in this class of cases, besides the loose cartilages there are also usually found much developed synovial fimbriæ; the articular surfaces are eburnated and marked with parallel ridges and

* Brodie on “Diseases of the Joints,” p. 234. Fifth Edition.

grooves, &c. For example, Cruveilhier has given the dissection of a case, of which he says, in the knee-joints there were many foreign bodies, some small, others large, some were free in the joint, others were connected to the articular surfaces by slender filaments. The synovial membrane of the knee was also furnished with *highly developed synovial fimbriæ*. The articular surfaces were also eburnated, and marked with parallel ridges and grooves in the direction of the movements of the joint.

In pursuing this inquiry as to the varied anatomical characters of this disease, let us next turn to the study of other facts which we can collect relative to this subject, by the examination of the pathological collections in the museums of these and other countries.

In the year 1842, while seeking for examples of the description of articular disease now under consideration, in the Museum of the College of Surgeons in England, I was greatly struck with the appearance and account given of one specimen, now nearly one hundred years old, of diseased knee-joint, which I found had formed part of John Hunter's original collection, and which had been dissected and preserved by himself. On reading his own account of the morbid appearances this case presented, we are led to infer that this great pathologist was fully acquainted with the *anatomical* characters of the disease it is the object of this work to elucidate.

We read in the Catalogue of this Museum the following account referring to the above-mentioned

specimen, viz : that John Hunter, in the year 1759, upon making the post-mortem examination of an aged female, the history of whose case was unknown to him, upon cutting into her knee-joints, observed four loose cartilages, one about the size of a nut flattened. In the knee-joints of this subject "the articular cartilages have been removed from the greater part of the patella; the portions near the borders alone remain. The cartilage of the external condyle of the femur has been removed to a similar extent, and the surfaces of bone thus brought into contact, and rubbed against each other in the movements of the joint, are hardened, polished, and worn down in parallel grooves, as if they had been chiselled. The remains of the articular cartilage on both bones are thin, and in many places degenerated into a soft fibrous substance; around their borders the bones are thickened and beset with projecting osseous plates and nodules." The other knee-joint of this old woman was much in the same condition.*

Mr. Lawrence presented a specimen of a knee-joint, thus diseased, to the Museum of the College of Surgeons in England, with the history of which he was unacquainted; but it is pretty evident that this specimen, which I have examined, and consulted Mr. Lawrence about, must also be considered an example of the effects of chronic rheumatic arthritis. This preparation is thus noted in the Catalogue:

* Catalogue of Museum of College of Surgeons, England, vol. II. p. 236.

“A knee-joint, to the walls of which many pendulous masses of bone and cartilage are attached. The extremities of both the femur and tibia are greatly enlarged, especially by the heaping up of bone, in large nodulated masses, around the borders of their articular surfaces.”

“This formation of *new* bone has taken place chiefly on the outer condyle of the femur and corresponding surface of the tibia, from both of which, also, nearly all the articular cartilages, after fibrous degeneration, have been removed, leaving the subjacent bone smooth and hard. The same changes, in a less degree, have affected the inner condyle of the femur and the rest of the articular surface of the tibia. The pendulous bodies are between fifteen and twenty in number; they are all attached by one of their surfaces, or by portions of tough fibrous tissue, to the walls of the joint, or to the masses of bone around its borders. They are irregular in form and size, varying from half an inch to nearly two inches in their diameter; their surfaces are nodulated, and for the most part osseous, but present isolated portions of substance like semi-transparent bone cartilage. They lie in various parts of the joint, and some small ones at the back appear to have formed *externally* to it. The fibrous tissues around the joint are all thickened and strengthened, with bands supporting and connecting the several pendulous growths.”*

Passing through Germany in September, 1842, I

* Catalogue of the Museum of the College of Surgeons of England, vol. II. page 236.

visited the University at Halle, as I was anxious to inspect the anatomical and pathological specimens there collected by the celebrated Meekel. Dr. Munter, at that time the Curator, showed me a knee-joint preserved in spirits, which, he told me, he, and all the visitors he had hitherto exhibited it to, considered to be quite an anomalous and unique specimen, the result of articular disease. For my part, I had no difficulty in at once arriving at the conclusion, that this specimen of diseased knee-joint was by no means unique, but that it was a very well-marked example of the effects of chronic rheumatic arthritis.

The synovial sac of the knee-joint was much dilated and thickened, and there were contained within it numerous foreign bodies, which were seen hanging from the interior of the walls of the joint. They were of an oblong rounded form; some of them appeared to be an inch and a half long in their greatest diameter. The preparation is, no doubt, a remarkable one, but seems to be quite a *fac-simile* of Mr. Lawrence's, which I have just mentioned I had seen in the Museum of the College of Surgeons of England. On this account I feel it would be superfluous to enter into further details concerning it.

The history of this specimen contained in the Museum of Halle was unknown.

I have, no doubt, seen examples* of patients whose knee-joints were affected similarly to the foregoing, and in whom the true nature of the articular disease was sufficiently indicated, not only by the local symp-

* See case of Mrs. Cassidy, also of Sheridan: see Index.

toms, but by the circumstance that very many of the other articulations in the same patient presented all the characters of chronic rheumatic arthritis.

CARTILAGES, FIBRO-CARTILAGES, AND BONES.

The articular cartilages of the knee-joint, when examined in cases in which the disease had been in an early stage, will be found to have lost their brilliant hue, and to have assumed a dull yellow colour; they are softened, so as easily to admit of the probe penetrating them, thinned, separated into fibres; and, in a word, in the first stage of disintegration. The semilunar cartilages are generally removed altogether, as the ultimate result of this disease. I have seen but two cases which formed exceptions to this observation. In one of these cases (Lynch), the semilunar cartilages in both knee-joints not only remained, but, strange to say, were in a state of great hypertrophy (see Atlas, Plate VIII. Fig. 4). In the other (M'Garry) the semilunar fibro-cartilages of the knee were converted into bone.

In most cases, however, the interarticular cartilages, as well as those of incrustation, are removed altogether, and the place of these last is supplied by a porcelain-like enamel of a white colour, marked by parallel ridges and grooves, which are seen running in the direction in which this hinge-joint had moved.

It has been already seen that the bones of the knee-joint are, as the result of this disease, found to be more or less enlarged, and increased in breadth. I

may add, that the patella, besides being much thicker and broader than natural, is excavated and grooved vertically (see Plate VIII. Figs. 1, 2, and 5) on its posterior and articular aspect, and may be found to be either partially or completely dislocated externally.

The surfaces formed on the head of the tibia, for the reception of the condyles of the femur, are sometimes much excavated, and the dry bones present a remarkably porous appearance (see Atlas, Plate VIII. Fig. 1), particularly in those who have been bedridden by the disease for years. In others the articular surfaces are eburnated, &c., &c.

In the Sandifort Museum, at Leyden, are to be seen many specimens of this disease, as it affects the bony structures of the knee-joint. When I compare the description and delineations given of these, with some specimens I have in my own possession, the histories of which I am well acquainted with, I cannot doubt but that those which are referred to by Sandifort in the "Museum Anatomieum" are good examples of the effects of chronic rheumatic arthritis; although it must be confessed that they are somewhat equivocally designated in his catalogue.*

As to the articular surfaces of the tibia, the internal is usually narrower than the external, which last

* For example, in one place they are referred to as bones of the knee-joint of an adult, "ex hydrope artieuli degenerata;" and in another, the change of form is said to have arisen "ex rheumatismo vel arthritide." The author also thinks it necessary to show that they were *not* the result of congenital malformation.—"Museum Anatomieum," vol. IV. page 43. Notwithstanding all this, it would appear to

is frequently found to present a large circular outline, partially surrounded by a rim of bone, and elsewhere having a smooth and eburnated surface.

The condyles of the femur have bony vegetations arranged along their lateral as well as posterior margins, similar to those we noticed around the corona of the head of this bone. These bony vegetations, or nodules of "semi-transparent bone cartilage," are characteristic marks of this chronic disease, whether we examine it in its effects on the head of the humerus or femur, or here on the lateral as well as posterior margins of the condyles* (see Atlas, Plate VIII. Fig. 2). The internal condyle is usually narrower, and descends somewhat lower than the external, and not unfrequently there is a partial displacement inwards of this condyle.

The subluxation of the femur on the tibia inwards must be looked upon as the most common displacement, the result of this disease; still, examples have not been wanting of deviations occurring, in other directions, of the femur at the knee. For example:— I saw an aggravated case of this chronic disease of

me that this great pathological anatomist had himself a clear idea as to the distinctness of the class of morbid appearances to which the specimens he alluded to belonged: in short, that he mentally referred them, as we do, to one and the same category, but felt the want of a recognised name by which to designate them.

* For some new views as to the formation of these osseous growths, see "Observations on the Enlargement of the Articular Extremities of Bones in Chronic Rheumatic Arthritis." By W. Adams, London. "Transactions of the Pathological Society," vol. III.

the knee lately in the Richmond Hospital, which was under the care of my colleague, Dr. Hutton, in which the head of the tibia was partially dislocated upwards and backwards behind the femur.

As illustrative of the ordinary anatomical characters of this disease as it affects the bones which enter into the composition of the knee-joint, I may again advert to those specimens which are contained in the Anatomical Museum at Leyden.

Sandifort, Jun., has given engravings of one of these, of which I have here attempted to give representations in miniature (see Figs. 10, 11, pages 215, 216); both these, viz., the anterior and posterior view of the knee-joint, well exhibit one remarkable feature of this affection, which I have before alluded to, when detailing the ordinary symptoms of this chronic disease, namely, the projection inwards of the knee, "*quantopere genua introrsum fuerant incurvata, ex ipsis figuris, satis elucescit.*"*

The engravings also show the anatomical cause of this leaning inwards of the knee in the elongation and descent of the internal condyle of the femur below the level of the external.

In Fig. 10, p. 215, the bones of the left knee-joint are viewed from before, and new osseous growths, the result of this disease, are here delineated as having sprung from the margins of the articular surface of the femur, as well as from the lateral

* *Loc. cit.*

and superior margins of the trochlea for the reception of the patella.

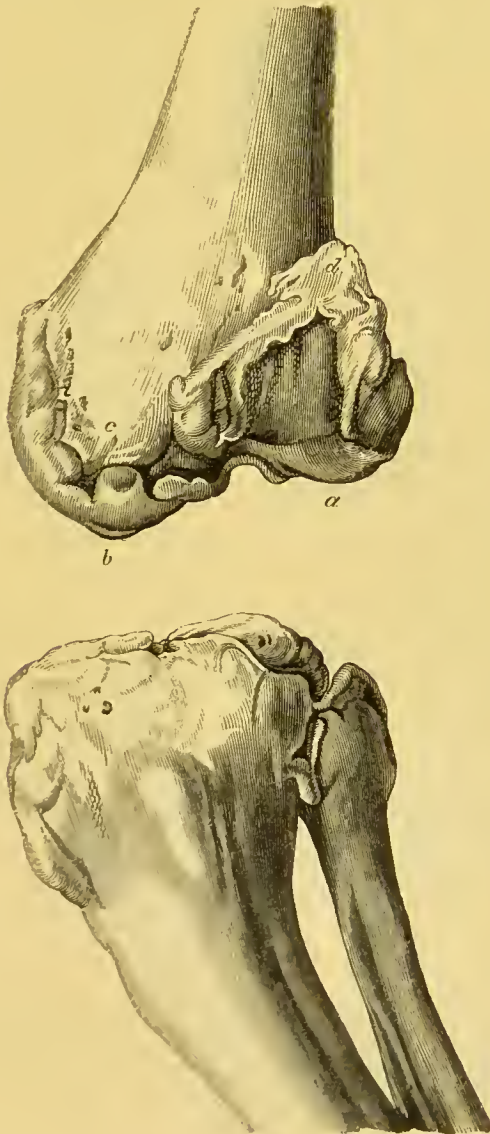


FIG. 10.

Left knee-joint, anterior view, after Sandifort.

From this view it is also seen, that the posterior part of the patella had corresponded to the front of the external condyle, *a*.

In Fig. 11 the left knee-joint is viewed from behind. The articular surface of the external condyle

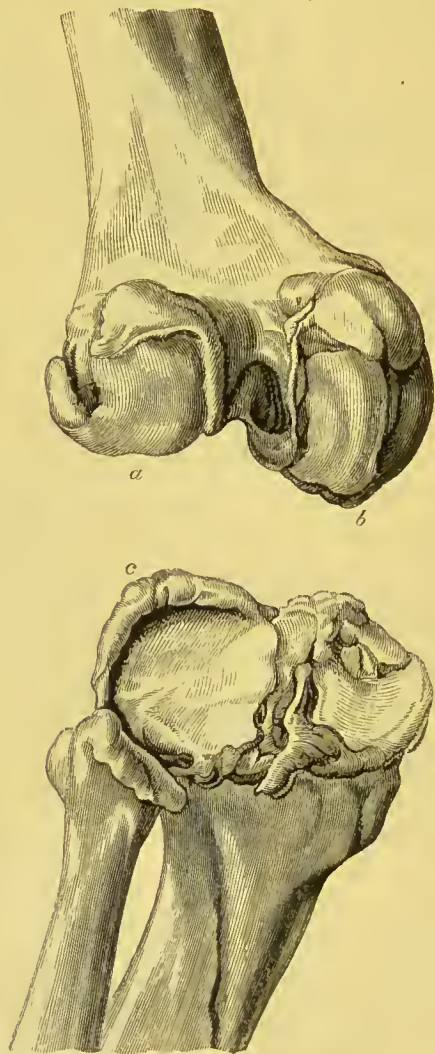


FIG. 11.

Posterior view of same left knee-joint, after Sandifort.

of the femur is observed to be broader than that of the internal condyle, *b*, which last was slightly subluxated inwards. We also notice, that the margins

of the articular surfaces of the condyles of the femur have superadded to them bony growths; that these margins are somewhat reverted, or, to use the language of the catalogue, “valde sunt excreti et pro majori parte revoluti.”

In this view of the left knee-joint from behind, we also notice that the articular surfaces of the tibia are greatly altered from their normal condition. The portion of this bone on which the external glenoid cavity was formed was observed to have been more compact in its substance than natural, and the surface of it was polished and eburnated, “polita ac quasi eburnea;” the anterior and external margin of the outer condyle of the tibia (*c*, Fig. 11) was in part circumscribed by a rising rim* of bone, or, to repeat the language of the author as to this margin, “cernitur excretus et revolutus.” It seems to have been in this case obviously inferred by the author, from the appearances of the articular surfaces, rather than from observation of the actual condition of the recent specimen, that the cartilaginous structures had been altogether removed.

* Professor Smith and I each possess specimens, the result of this disease, showing the rim of bone, and the eburnation of the external condyle of the tibia, which critically resemble the engraving by Sandifort.

CHAPTER V.

THE DISEASE IN THE WRIST, AND IN THE JOINTS OF THE CARPUS, METACARPUS, AND PHALANGES.

THE wrist-joint, together with the joints of the carpus, metacarpus, and phalanges, are more frequently affected with chronic rheumatic arthritis than any of the other articulations. This disease, as it affects the joints of the hand, has since Haygarth's time been but cursorily alluded to by medical writers. Some have looked upon it as a disease of elderly persons, principally showing itself in females at the critical period of life; but although elderly females seem to be the most frequent subjects of this affection, it is to be seen occasionally in the young of both sexes. I have had lately under my care in the Richmond Hospital two well-marked examples of this disease: one of them was a girl, eighteen years of age, and the other a man, aged twenty-seven years.*

When it has had a constitutional origin, the law

* These are by no means solitary cases. See as to this point "Practical Remarks on Gout and Chronic Rheumatism of the Joints," p. 170. By R. B. Todd. London: 1843.

of symmetry, which so usually prevails in diseases originating in the blood, is to be found governing its phenomena. In such cases the wrists, as well as all the small joints of the hands, are affected equally on both sides, and very frequently many of the other articulations are similarly implicated, as, for example, the elbows, shoulders, and knees.

When the disease is local, confined to one articulation, or to the joints of one region, as to those of the wrist and hand, we find that in most of such cases its origin is to be referred to accident, or to a preternatural amount of labour having been thrown on the affected articulations.

The wrist-joint, when affected by this disease, presents a preternatural convexity on its dorsal aspect, and sometimes the bursæ here are distended with fluid. The lower extremities of the radius and ulna, more especially the latter, seem slightly displaced backwards (see Atlas, Plate x. Fig. 3 ; and Fig. 16, p. 234), and are usually observed to be enlarged. When the wrist-joint has been long and severely affected by the constitutional form of the disease, the motions of the hand at this articulation become limited to those of flexion only ; for abduction and adduction, confined as they are in the normal state of the joint, are now annihilated, and extension of the hand beyond the line of the longitudinal axis of the forearm is impracticable. The wrist-joint is not merely stiff, but rigid, and any attempt to move it is painful to the patient.

In the inferior radio-ulnar articulation a certain

limited degree of rotation, accompanied with erepitation, exists.

The back of the hand ultimately presents an attenuated appearance, showing the course of the tendons, and allowing the ridges and prominences of the bones to become visible.

All the median joints of the fingers become enlarged, as well as those which are formed by the junction of the first phalanges and metacarpal bones. The fingers are usually flexed towards the palm, and are at the same time generally much adducted towards the ulnar side of the hand. The lower extremity of the metacarpal bone, which joins with the basis of the first phalanx of the index finger, seems specially swelled and enlarged, and projects much towards the radial side and dorsal aspect of the hand (Atlas, Plate vi. Fig. 1, also Fig. 13, p. 222). This salient angle, formed on the radial side of the hand by the flexion and excessive adduction of the fingers, is so usual, that the form thus impressed upon the hand is looked upon as quite characteristic of rheumatic gout.

Yet, varieties do occur in the form the hand assumes under the influence of this disease, which we must not omit to mention. We have, for example, found the lower extremities of the metacarpal bones enlarged, and the first phalanges of the fingers flexed towards the palm, but not in the least degree *adducted* towards the ulnar side, and consequently, in such cases the angle of junction of the metacarpal bone with the basis of the index finger was by no

means salient towards the radial side, but towards the dorsal aspect of the hand only (Fig. 12).

The median and last joints of the fingers are very generally found in a flexed condition, but exceptions to this rule are observed; it is by no means uncommon to find the median joint of one or all of the fingers in a preternatural state of extension, so that the first and second phalanx may form an angle with each other, salient anteriorly towards the palm (Fig. 12), and the excess of the degree of extension

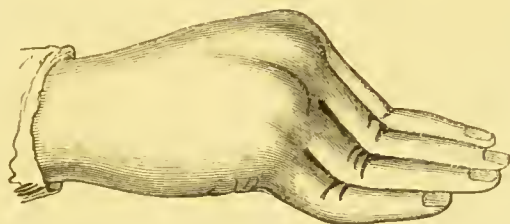


FIG., 12.

A form of chronic rheumatic arthritis of the joints of the hands. (Cast in Author's Museum.)

may amount even to a luxation of the basis of the second phalanx on the dorsum of the first.

Whenever the joint formed by the union of the *metacarpal bone of the thumb with the trapezium* (Fig. 13, A, and Fig. 14, A) is affected with chronic rheumatic arthritis, the line of the articulation is marked by a rising ridge of osseous growth, which can be seen and felt through the integuments; in this case the motions of the joints are impeded, but the normal direction of the metacarpal bone does not seem to be altered by the presence of this disease in the articulation, nor does any dislocation occur.

When the disease affects the *metacarpo-phalangeal joint* of the thumb (Fig. 13, B), this last is almost always preternaturally flexed, sometimes even to a

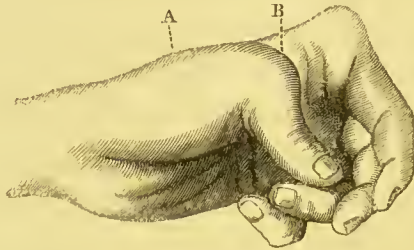


FIG. 13.

Effects of chronic rheumatic arthritis on the hand. A, Carpo-metacarpal joint. B, Metacarpo-phalangeal joint of the thumb.

right angle, and adducted at its metacarpo-phalangeal joint, while its last, or unguinal phalanx, is in a marked state of extension (see Fig. 13). Dr. M'Dowel, however, last winter session,* laid before the Surgical Society of Dublin one instance in which a state of things exactly the reverse of the foregoing

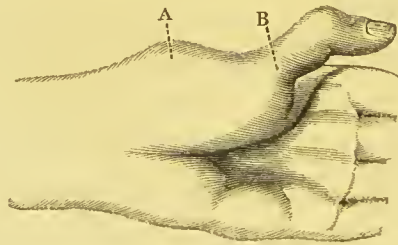


FIG. 14.

Rare effects of chronic rheumatic arthritis on the metacarpo-phalangeal joint of the thumb. A, Carpo-metacarpal joint. B, Metacarpo-phalangeal joint of the thumb.

existed, for in this last and rare specimen, the first phalanx of the thumb (Fig. 14) was preternaturally

* Dublin Medical Press, June 6, 1855, p. 353.

extended, and abducted to a degree which almost amounted to a luxation backwards, while the ungual phalanx was flexed, so that the appearance presented was much that of the accident called Hey's dislocation of the thumb.

Luxations of the bones of the fingers are frequently the consequence of this chronic rheumatic disease. The most usual dislocation I have observed is that of the first phalanx of the little finger forwards towards the palm, from the head of its metacarpal bone (Fig. 16, p. 234, and Fig. 17, A, p. 237).

Cruveilhier* has described and delineated a case in which the bases of all the phalanges of the fingers were thus dislocated towards the palmar surface of the hand. This displacement forwards of one or all of the first phalanges, as the result of this chronic disease, is not, it would appear, of uncommon occurrence. On the contrary, luxation of the *basis* of the first phalanx *backwards* must be considered very rare. Anatomists do not speak of such an occurrence as the result of any disease, and I have seen but few examples of such displacement. However, in visiting Professor Vrolik's Museum, in Amsterdam, in August, 1847, I noticed the skeleton of a hand, which, from the appearance of the carpus, &c., I judged had long been affected by chronic rheumatic arthritis. The first phalanx of the little finger had its basis in this specimen dislocated on the dorsum of its corresponding metacarpal bone. This and Dr. M'Dowell's case, already alluded to (Fig. 14), are the only examples of

* Livraison XXXIV. Planche 1.

luxation or sub-luxation of the *first* phalanx backwards I have seen. These observations, however, it may be necessary to remark, apply only to the metacarpophalangeal joints, because we meet with numerous specimens of dislocation backwards at the median joints of the basis of the second phalanx on the dorsum of the first, the result of the disease. (See Fig. 17, B, p. 237, case of Donohoe.)

ANATOMICAL CHARACTERS OF THIS DISEASE AS IT AFFECTS THE WRIST JOINT, THE CARPUS, METACARPUS, AND PHALANGES.

When we remove the fibrous covering of the tendons which lie on the back part of the wrist joint, we find that these tendons are generally sunk down in deep bony grooves on the back part of the radius and ulna. The capsular ligament, both on the back part and front of the wrist joint, seems to have acquired unusual strength.

At the ordinary advanced period of the disease, at which, only, opportunities of examining anatomically the interior of the wrist occur, we notice that all the articular cartilage has been removed from the ends of both the radius and ulna. The inter-articular fibro-cartilage, which intervenes between the extremity of the ulna and the euneiform bone, is also removed altogether, so that the ulna now enters into the cavity of the radio-carpal articulation, and the evidence of contact and attrition between the lower extremity of this bone and the euneiform is seen in

the eburnation of the articular surfaces of both bones. There is little left of synovial membrane: in some cases we have found red, vascular, synovial fimbriæ in the wrist-joint, just as we have noticed these fimbriæ in other articulations affected with this disease. Pendulous foreign bodies are sometimes, though rarely, found within the cavity of the wrist-joint.

The lower extremity of the radius is usually somewhat enlarged, and the surface of the bone on its dorsal and palmar aspect is scabrous from small exostotic growths. The grooves formed on the back of the radius for the passage of the extensor tendons are bordered by rising ridges of bone.

The lower articular surface of the bone for the reception of the first range of the carpus is hollowed out and polished, and its aspect is more obliquely inclined forwards than natural. (See Atlas, Plate x. Fig. 1.) The outline of the carpal articular surface of the radius is often studded round with bony granules, and generally there is a thin, sharp edge superadded to the anterior margin of this articulation, which increases the antero-posterior diameter of this surface, and thus accommodates the carpus, which seems usually advanced more than natural, a circumstance accounting anatomically for the slight appearance of sub-luxation forwards of the carpus, and backwards of the radius and ulna, observable in these cases (see Fig. 16, p. 234).

On the lower extremity of the radius, on its ulnar aspect, we notice the lesser sigmoid cavity, for the reception of the carpal end of the ulna, much in-

creased in size and eburnated, and there are seen fine parallel ridges and grooves in the line of the rotation of this extremity of the ulna on the radius.

ULNA.

The carpal extremity of the ulna is frequently much enlarged, and furnished with exuberant bony growths (see Atlas, Plate III. Figs. 4 and 5); its lowest extremity, where it confronts the euneiform bone of the carpus (without the intervention of cartilage) is smooth and sometimes highly polished. The part of this bone destined for rotation on the radius is convex and oval from before backwards, of a form, of course, adapted to that of the little scaphoid cavity in the latter, and, like it, deprived of cartilage, eburnated, and similarly marked with parallel ridges and grooves.

CARPUS.

In our anatomical investigations into the state of the hands of those who have long laboured under chronic rheumatic arthritis as a constitutional disease, we have found the *bones of the carpus* to be much altered. In general the region which these bones constitute will be found to have all its dimensions contracted within a smaller compass than natural. The form of each individual bone is so much changed, that if found detached it could scarcely be recognised as a carpal bone; sometimes it may be smaller, occasionally larger than natural. The ear-

ligamentous structure naturally intervening between all the bones is always absorbed.

Cruveilhier has said,* that in the anatomical examination of one of his cases of this disease, he found the bones of the carpus confounded together into an irregular mass, so that it was difficult to decide what part each took in the construction of the carpal region. In this case the superior extremities of the metacarpal bones were said to have been imperfectly ankylosed to the carpus.

The outer surface of the small carpal bones, after maceration, present a scabrous appearance. (See Atlas, Plate x. Fig. 2.) The ivory-like deposit so frequently observed in other joints is also found investing the articular surfaces of the carpal bones in this disease, more especially of the scaphoid, lunare, and head of the os magnum.

This eburnation in one case, I think, I could easily trace to the exertion the hands had undergone by the continued use of crutches, which were rendered necessary helps in locomotion, as the lower extremities had been so long crippled by this disease.

The following account of a specimen of this chronic disease, as it affected the wrist-joint and carpal bones, may be here introduced. It is the only example I have known, in which pendulous foreign bodies were found to exist in the radio-carpal articulation.

During the winter session, December 3, 1853, Professor R. W. Smith laid before a meeting of the

* *Livraison XXXIV.*

Pathological Society of Dublin a very remarkable specimen of this disease, affecting the lower extremities of the radius and ulna, and carpal bones. "The cartilage had disappeared from all the articular surfaces, and the reticular tissue of the bones was exposed, with the exception of the cuneiform, which presented a highly polished and smooth surface, like that of ivory; it was in contact with a similar surface upon the end of the ulna, the triangular cartilage having been absorbed. The scaphoid bone was greatly enlarged and flattened,—it measured an inch and a half in length, and an inch in breadth. The enlargement had taken place chiefly towards the dorsal surface of the wrist. The semilunar bone was also much enlarged, and its centre was traversed by a complete solution of continuity. *Several foreign bodies* (one of which was as large as the pisiform bone) were connected with the dorsal margins of the semilunar and cuneiform bones and adjacent ligamentous structure. There were likewise two connected with the anterior annular ligament and with the palmar aspect of the semilunar bone. The pisiform bone was hypertrophied.

"The lower end of the radius was of immense size, being two inches in extent from side to side, and one inch and a quarter from before backwards, and the palmar margin of the articular surface was fringed with large and very irregular stalactitic osseous growths. The portion of the surface which was in contact with the anterior division of the pyramidal bone was slightly polished.

“The inferior radio-ulnar joint was also implicated in the disease, the articular surface upon the radius being an inch in its antero-posterior diameter, its vertical extent being three-quarters of an inch. The lower extremity of the ulna was similarly altered, and its flattened styloid process had become articular, and rested upon the enlarged and eburnated cuneiform bone.

“The external appearance of the joint, before the integuments were removed, resembled very much those which have been described by surgical writers as marking the luxation of the lower ends of the radius and ulna backwards. The patient was a female of advanced age, and the disease had been supposed to be the ordinary caries of the radio-carpal joint, but without suppuration having occurred. The chronic rheumatic disease, of which the wrist presented so striking an instance, had also established itself in the metacarpo-phalangeal articulations.”*

METACARPUS AND PHALANGES.

When we make the anatomical examination of the hands of a patient whose fingers at the time of his death presented the usual characters of this disease, we find, when the integuments have been removed from the meta carpus and fingers, that the *tendons* of the extensor muscles present a normal appearance as to their structure, but that their usual direction, as they pass from the metacarpus to the phalanges, has been altered; being displaced from their proper

* Professor Smith's Museum

grooves as they pass over the heads of the metacarpal bones, they are thrown towards their ulnar side into new grooves, which have been formed by the constant action of these tendons on the bones. This new position of the tendons on the outer surface of the heads of the metacarpal bones must render nugatory the action of the muscles to which they belong as extensors, or, if these muscles have now any action on the fingers, it must be to flex rather than to extend them.

The flexor tendons are found to be unaltered, and in their natural position. They have in their course to pass in front of the heads of displaced bones, but they are not thrown from these grooves, as the extensor tendons are.

The *ligamentous structure* we have found increased in thickness when connected with the small joints of the fingers; whether this fibrous structure formed capsular or lateral ligaments, the latter always appeared to us elongated. This elongation we have usually found to exist to a degree, sufficient to permit of luxation of the bones, without any of the lateral ligaments suffering interruption of the continuity of their fibres (Fig. 17, A, B, p. 237).

When we cut through the fibrous covering of any of the joints of the hand, we observe that every trace of cartilage or incrustation has been totally removed, and we notice an abundance of vascular synovial fimbriæ occupying depressions in the interior of the small joints.

The fingers seem rigid, and on a superficial exa-

mination we might suppose that some of their joints were truly ankylosed, but true bony ankylosis of the fingers I have not seen. When we examine carefully some of the rigid articulations of the phalanges, such as are neither luxated nor sub-luxated, we have noticed, in many cases, a red fibro-cellular structure directly intervening between the corresponding articular surfaces of the phalanges uniting them together.

BONES.

From the bones of the hand, all the articular cartilages will be found to have been removed; some of the bones are rough and scabrous, and present a porous appearance; some present a high polish. We have already noticed this last appearance on the scaphoid bone of the carpus, and on the extremities of the enlarged metacarpal bones where they enter into the formation of the joints of the hand; but nowhere do we find the characteristic traces of the chronic rheumatic arthritis of the hand better marked than in the metacarpo-phalangeal joint of the thumb. (Atlas, Plate x. Fig. 4, A.) The trapezium and superior extremity of the first phalanx of the thumb have their articular surfaces sometimes extended to twice their normal size, and these surfaces are eburnated, polished, and surrounded by exuberant bony nodules. The shaft of the first phalanx of the thumb has generally a characteristic appearance, being bent much towards the palmar surface, and is shorter than natural (see Atlas, Plate x. Fig. 4). The metacarpal bones and the phalanges are

variously changed by this disease (see Atlas, Plate vi. Fig. 2; also Fig. 17, p. 237). In many cases we find that the cancellated structure of the bases of the phalanges is exposed, and excavated into a kind of cup, which accommodates the enlarged head of the metacarpal bone, and generally around this cup a growth of new bone, of a looser reticulated texture, is thrown out.

In the removal of the cartilage without suppuration; in the substitution for it of a porcelain-like surface; and in the surrounding exuberant growth of new bone, we find this disease, as it leaves its traces on the joints of the fingers, presenting a perfect similarity to the alterations produced by it in the larger articulations.

The following abstract from the history of a case will serve as an illustration of this disease as it affects the wrist and hand.

CASE XIII.

P. Donohoe, a carter, aged 38, a man of intemperate habits, had been under my observation for ten years either in the Richmond Hospital or adjoining Poor-house. Scarcely any of his joints had escaped the effects of chronic rheumatic arthritis; but I would here call attention to the part of the case specially which will serve to illustrate the disease as it affects the region of the wrist-joint, carpus, and hand. Both hands were similarly affected. I had a drawing taken of his right hand when first admitted under my

care November 24th, 1836 (see Fig. 15). At this period the wrist and hand of the patient were large and strong, such as we might expect to find in a powerful labouring agriculturist. The hand was



FIG. 15.

CASE OF P. DONOHUE.—Effects of chronic rheumatic arthritis of the right hand. Copy of a drawing taken on his admission into hospital, nineteen months after the disease had commenced in it. (See Collection in the Museum of the Richmond Hospital.)

strongly adducted towards the ulnar side; the thumb was itself also slightly flexed at the metacarpo-phalangeal joint, which was somewhat enlarged; the last phalanx of the thumb was extended (Fig. 15). We remarked, that at this period we could with very little force bring the hand to a straight line with the forearm, and that when thus placed mechanically in a proper position, it would so remain for a considerable time. The metacarpo-phalangeal joints were slightly enlarged, and the little finger at its median joint was somewhat contracted (Fig. 15).

When we again examined, in August, 1846, the same right hand, we found it to have been greatly altered by the slow but gradual advance of disease during a period of nearly ten years. The wrist, we found, was now narrowed, and rendered remarkably convex on its dorsal aspect. The lowest part of the bones of the forearm in this region seemed to have undergone a process of partial displace-



FIG. 16.

CASE OF P. DONOHUE.—Effects of chronic rheumatic arthritis on same right hand, from a drawing taken nearly ten years after that above delineated in Fig. 15.

ment backwards. The whole hand was emaciated, and strongly adducted towards the ulnar side at the metacarpophalangeal joints, and, moreover, the fingers were somewhat flexed at these and the extreme joints, while the median joints were extended even beyond the natural straight line, so as to be rendered convex forwards on the palmar aspect.

When we compare the broad wrist and expanded hand of the patient at the period of his admission into the Richmond Hospital, with the wasted wrist

and contracted joints of the same hand ten years afterwards, as represented by drawings taken at the two periods specified (see Figs. 15, 16, pp. 233, 234), we get a melancholy lesson as to the inveterate nature of this chronic disease, and as to the alteration it ultimately produces on the wrist-joint and hand.

In October, 1846, this man died of dysentery, and the following are the notes taken on making the anatomical examination of one of the hands:—

The Wrist.—The carpal extremities of both bones of the forearm were enlarged, and presented, all round their articular surfaces, exostotic growths. The carpal surface of the radius seemed to have its articular aspect directed a little more anteriorly than natural, which accounted for the appearance of subluxation forwards of the carpus having been greater than that which really existed, as well as for the great convexity of the back part of the wrist. This carpal articular surface of the radius presented polished and rough patches. The polish was due to some slight eburnation which was the result of the attrition against each other of the articular surfaces, after the cartilages had been absorbed, while the rough porous appearance at the side of the polished portion was the consequence probably of the vital action of absorbing villi, and vascular tufts, which were noticed to occupy depressions formed in the articular surface of the radius. The styloid process of this bone was misshapen and blunt, and the little scaphoid cavity for the articulation with the

lower extremity of the ulna was much increased in size, to accommodate the lower extremity of the ulna, which was also much enlarged, and we could observe that the scaphoid cavity on the ulnar aspect of the radius was to a small extent eburnated, and marked *with ridges and grooves*. These were parallel to each other, and ran from before backwards, in the direction of the rotation of the ulna on the radius, which motion had evidently created these grooves.

The metacarpal joints of the fingers, we have already noticed, were the seat of the permanent flexion and adduction of the phalanges, which characterize this chronic disease. The joint formed by the head of the metacarpal bone, and basis of the first phalanx of the index finger, was provided with a broad and expanded lateral ligament on the radial side of this joint, and with a smaller and shorter one on its inner or ulnar aspect. The cup-like cavity of the bases of the first phalanx corresponded to a well-marked surface on the *palmar* aspect of the lower extremity of the first metacarpal bone. This articular surface was eburnated and highly polished, and much enlarged.

There was a complete luxation forwards of the bases of the little finger from the fifth metacarpal bone; the lateral ligaments were found perfect, but elongated (Fig. 17, A, p. 237).

The middle joints of the fingers were in a state of extreme extension, so that the anterior surface of each finger was arched, its convexity being towards

the palmar surface, and was not only incapable of being flexed at the median joint, but could not be brought even to a straight line. Indeed, this excess of extension of the median joint of the ring finger



FIG. 17.

CASE OF P. DONOHUE.—Effects of chronic rheumatic arthritis on the same right hand, delineated in Figs. 15, 16, as exhibited on post-mortem examination, upwards of eleven years after the commencement of the disease. A, The base of the first phalanx of the little finger luxated forwards. B, Luxation of the second phalanx of the ring finger, at the median joint, backwards. C, Trapezoides diminished in size, and ankylosed to the basis of metacarpal bone of index finger. D, Os magnum, narrowed and ankylosed to the scaphoid. All the phalanges have become slightly curved, as the result of this disease.

had gone so far, that in this dissection we found that a dislocation of the bases of the second phalanx, B (Fig. 17) on the dorsum of the first phalanx of the ring finger had taken place. As in the other luxation

last alluded to, the lateral ligaments, though altered in their direction, were perfectly normal in other respects.

The last or unguinal phalanges of all the fingers were flexed, except that of the thumb, which was extended.

Carpus.—The bones of the carpus were exceedingly rough on their non-articular surfaces; each individual bone was found much altered from its normal form; some were enlarged beyond their usual size, others were diminished.

The true annular ligament of the carpus, which connected the small bones together on their palmar aspect, and contributed to maintain the arched form of this region, was much shorter than usual.

When we examined each bone, we found that the scaphoid was eburnated on its superior articular surface, where it corresponded to a similar surface on the carpal end of the radius. Inferiorly, the scaphoid, instead of contributing with the head of the os magnum to form part of the medio-carpal articulation, was really *united* to the head of the magnum (Fig. 17, D) by true bony ankylosis. The semilunar and euneiform bones of the first range were much enlarged. The portions of both surfaces of the magnum and lunar bones, which confronted each other, were covered with an ivory-like polish. The trapezium, where it supported the first phalanx of the thumb, was polished on its pulley-like articular surface. The trapezoides (Fig. 17, C) was much diminished in size, and *solidly ankylosed with the metacarpal bone of the index*

*finger.** The transverse diameter of the magnum (Fig. 17, D) was not one-quarter of an inch, and the loss of breadth to this degree accounted somewhat for the narrowing of the carpus already noticed. The cuneiform was normal; the pisiform was much hypertrophied.

The junction, then, of the magnum with the scaphoid, and the equally solid bony union of the trapezoides with the metacarpal bone of the index finger, were the only articulations of this region, or, indeed, of the whole skeleton of this individual, which presented specimens of true bony ankylosis.

Such is this disease, as it affects, in a constitutional form, the articulations of the wrist and hand; but it would appear that the malady occasionally, though rarely, presents itself as a local disease in these articulations, just as it does in the other joints of the hip, shoulder, or elbow. When the disease is local, confined to one region, as, for example, the wrist, or to the articulations of the wrist and hand collectively, it will, I imagine, be generally discovered that the complaint has come on very gradually, and that the cause of it has been referred by the patient either to injury, or to an extraordinary amount of

* It is somewhat remarkable, that in these two circumstances of the ankylosis of the trapezoides with the metacarpal bone of the index finger, and great increase in size of the pisiform bone, there was an exact identity in the effects of this disease on the carpal region in Mr. Smith's case, p. 228, and in the foregoing.

labour having been for a continuance thrown on the joints which we see affected.

Haygarth mentions the case of one of his patients, a man between 50 and 60 years old, who must be considered to have presented a good example of this disease in its *local form*. "The patient ascribed the complaint to a fall that had violently strained the wrists and fingers, which *were the only seat of the nodes* in this case."

In the Winter Session of 1852 I laid before a meeting of the Pathological Society of Dublin two specimens, the result of chronic rheumatic arthritis of the *local form*, which had affected the articulations of the right wrist-joint and hand of the patients. In neither of these cases was there any lesion observable in any of the other joints. It was collected during their last illness from the patients themselves, from whom the post-mortem specimens had been removed, that they never suffered any other inconvenience from the abnormal joints, than a slight degree of weakness in them, which did not prevent them following their ordinary occupation as labourers; in both cases the lower end of the ulna of the right forearm was greatly enlarged, very movable, and susceptible of being subluxated backwards and forwards. The radio-carpal joint itself seemed loose, and the transverse measurement of the wrist increased, chiefly owing to the carpal end of the ulna having been enlarged all round, whereby the interosseous interval, immediately above the joint, was rendered wider than natural, the wrist itself broader.

In examining either of these patients, that which most attracted attention was the enlarged and rounded extremity of the ulna, which projected backwards much behind the level of the dorsum

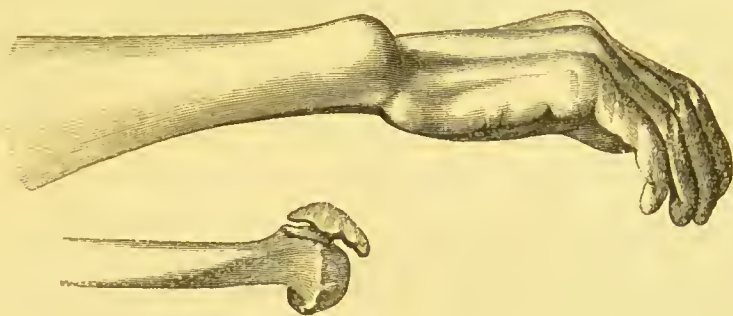


FIG. 18.

Drawing from a cast of specimen No. 1. The lower extremity of ulna is seen projecting behind dorsum of carpus. Fingers slightly flexed and adducted towards the ulnar side.

of the wrist, forming a tumour the shape of half a spheroid, of about an inch in diameter. The forearm, viewed along its ulnar border, showed towards the front the sharp edge of the flexor carpi ulnaris, and the internal lateral ligament, above an inch in length, could be felt forming a tense cord, which passed obliquely forwards to the carpus. The hand seemed somewhat in advance of the radius,* and was more movable than natural at the wrist-

* The only allusion I can find in authors to any cases similar to these (if I except the solitary one I have quoted from Haygarth, page 240) is contained in the *Leçons Orales*, par M. le Baron Dupuytren, (tom. iv. p. 209), who observed that under the influence of over-work the ligaments of the wrist-joint occasionally become elongated, that the carpus thus loosened yields to the action of the flexor muscles, and becomes partially *displaced forwards*, &c. It does not appear that the Baron had had any opportunity of ascertaining by anatomy the true nature of the affection, but alludes to it as a "*variety of the wrist-joint*" which hitherto had not been sufficiently studied by practitioners.

joint. The enlarged extremity of the ulna could be easily pushed backwards and forwards.

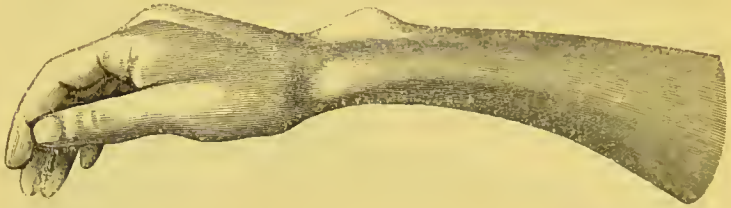


FIG. 19.

Another view of same forearm and hand, Specimen No. 1. (In Author's Museum.)

All these symptoms and external appearances were similar in both patients, who were labourers, of the same age, about 45, and attributed the condition of their wrist-joints—of which, however, they did not complain—to hard labour and over-exertion of their right hands. One of these patients died of fever in the Hardwicke, and the other of bronchitis in the Whitworth Hospital, and Dr. Gordon, one of the physicians to these institutions, was kind enough to send to me the two extremities for anatomical examination. Casts of the right or affected forearm and hands, in both cases, having been taken, there was then a careful dissection made of them, and the following morbid appearances were observed, and exhibited to the Pathological Society.

In the first of these specimens, No. 1, which was the best marked (see Figs. 18, 19, 20, 21), all the ligamentous and fibrous structures were found much hypertrophied. The cartilaginous covering of the articular surfaces of the radius and ulna were remarkably thin and attenuated, while, on the contrary, the triangular fibro-cartilage separating the end of the ulna

from the cuneiform bone was greatly hypertrophied. The synovial membrane, where reflected from the edges of the circumference of the articular surfaces of the radius and ulna, was of an intensely red colour, and here a commencement of the growth of the usual vascular fimbriæ had appeared.

The carpal extremity of the ulna presented a very remarkable abnormal appearance: it was greatly enlarged, and resembled much the upper extremity of the radius inverted (Fig. 20), with its thick lip and circular rim exceeding the circumference of the shaft. The circular growth of bone from the carpal end of the ulna thus formed a projecting edge, a species of corona, from around which the synovial membrane was reflected, and the vascular fimbriæ sprang.

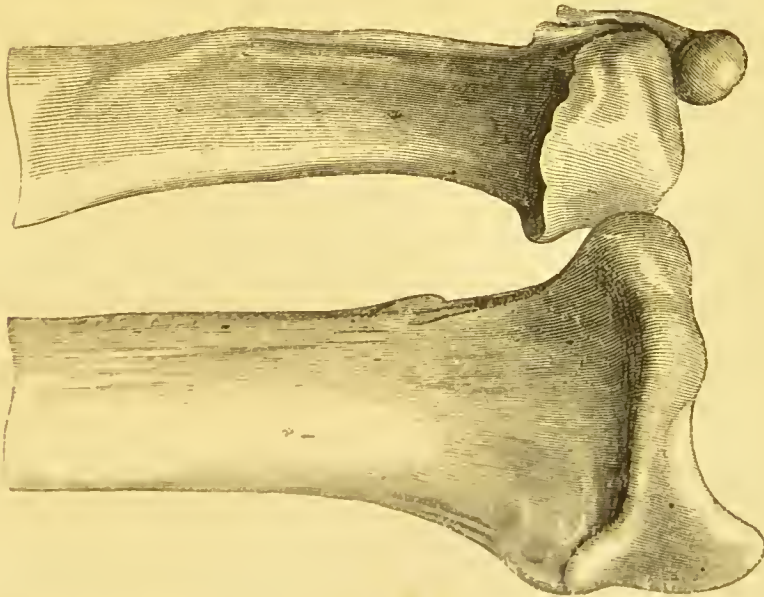


FIG. 20.

Drawing of specimen No. 1. Right radius and ulna, viewed anteriorly, in supination. The lower articulating process of ulna enlarged. Anterior portion of articular surface of radius presenting a sharp margin. (Author's Collection.)

In the usual situation of the styloid process of the ulna, the bone had been very exuberant, and had connected with it the internal lateral ligament of the wrist. This ligament was as thick as a crow-quill, and fully an inch in length. The portion of bone to which this ligament was attached was about the size and shape of an almond, placed longitudinally (Fig. 21), and had the appearance of having been of

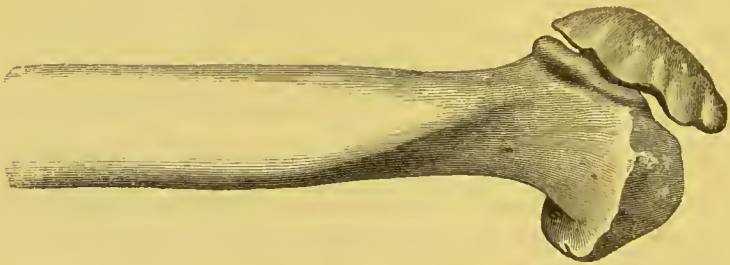


FIG. 21.

The right ulna, with the almond-shaped portion of bone in the situation of the styloid process; united by a false joint to the ulna. Specimen No. 1. (Author's Museum.)

recent formation, and was movable with the ligament; but the most remarkable circumstance here to be noted was, that the almond-shaped portion of bone was connected by means of a fibrous and fibro-synovial apparatus to the rest of the ulna; in fact, a false joint existed here.

The lower articular surface of the radius (Fig. 20) had its aspect inclined somewhat more forwards than natural, and was much enlarged, an anterior margin having been added to it, as is usual in all cases in which this chronic disease of the wrist exists; the carpus seemed to be articulated more with the anterior half of the articular surface of the radius than the pos-

terior portion. The bones of the carpus were larger than natural, as were also all the metacarpal bones and metacarpo-phalangeal joints.

The fingers presented in a slight degree the flexion and adduction towards the ulnar side which belong to rheumatic gout, and the bones of the thumb above all others bore the well-marked characters of this disease. For example, the metacarpo-phalangeal joint of the thumb was much enlarged, while its metacarpal bone was shorter and thicker than natural; it was also much incurvated towards the palm; in short, the bones of the thumb in this specimen (Fig. 18) exhibited exactly those alterations in form and size which we have always noticed these small bones to present on the anatomical examination of the hands of those who had been affected with chronic rheumatic arthritis, and which appearances I have elsewhere described (page 231) and delineated (see Atlas, Plate x. Fig. 4).

As to the second specimen I produced, the bones had been macerated, and their scabrous surface, now that the periosteum was removed, was well seen.

The bending forward of the shaft of the radius, the additional thin angular edge or lip increasing in the anterior direction, the articular surface, the enlarged carpal extremity of the ulna, were also seen in this specimen, as well as the curious movable apophyses (as it were an enlarged styloid process united by a false joint to the rest of this bone), and the lengthened lateral ligament,—all these, though in an earlier or rather in a less developed stage of

disease, were equally seen in this second specimen, as in the former example No. 1 (Fig. 21) presented to the Society.

We should be quite at a loss to know to what class to refer the phenomena noticed in these two specimens, were we not afforded some clue to the explanation of them, by our being familiar with the changes produced by chronic rheumatic arthritis on the articular textures,—the morbid alterations produced on the bones, apparently by too much wear of the articulations, in the instances I have just adduced, seem analogous to, if not identical with, those which we find to be the result of chronic rheumatic arthritis involving the same structures.

It is curious that the two specimens presented exactly the same appearance as to the enlarged styloid process, except that in the first specimen exhibited (Fig. 21), the piece of detached bone seemed nearly double the size of that seen in the second specimen produced. Some may naturally suppose that a fracture of the styloid process in both instances, and failure of osseous union, might have been the source of all the weakness of the joint alluded to, as well as find in such an hypothesis an explanation of the phenomena the anatomical examination exhibited. Nor have we at present any means of decidedly contravening such an idea. For my part, however, I look upon both specimens as constituting decided examples of the local

and hypertrophic form of chronic rheumatic arthritis, and that the disease in these instances was the result of over-work. The detachment of the styloid process, the enlargement of the separated portion, &c., have an exact analogy in the very remarkable circumstances first noticed by myself in 1834, and subsequently by Professor Smith, namely, the connexion of the acromion process of the scapula by means of a similar false joint, in certain cases of chronic rheumatic arthritis of the shoulder.*

It is also worthy of remark, that, while in the ordinary cases of this chronic disease we usually find the interarticular cartilages and those of encrustation all removed, and the place of these last supplied by an ivory-like deposit, in one of these cases, the interarticular fibro-cartilage, instead of being absorbed, was really in an hypertrophied condition, and no eburnation of any of the articular surfaces had been observed; upon which we have to observe, that although a hypertrophied state of the interarticular fibro-cartilage is rarely found in the examination of joints which have been affected by chronic rheumatic arthritis, still, we have noticed this hypertrophy in the interarticular fibro-cartilages of the knee-joint (see Atlas, Plate VIII. Figs. 3 and 4, case of Lynch) in a decided example of the chronic disease alluded to. Moreover, it is to be recollected, that the absorption of the cartilages and the eburnation of the surfaces are rather late effects of chronic rheumatic arthritis; and that in these two cases, although the disease may have

* See case of Byrne, Atlas, Plate III. Fig. 2, B, B. See also pages 107, 122.

existed in the radio-ulnar and radio-carpal joints for years, yet it had so happened that it had not made much progress. That the affection, however, must be considered as a form of chronic rheumatic arthritis, I cannot doubt. The peculiar appearance of the ulna (Figs. 20, 21); its carpal articular portion having been so exuberant and so much enlarged; the highly vascular condition of the sub-synovial tissue of this and of the radio-carpal joint; and the enlargement and prominent sharp lip anteriorly of the lower articular extremity of the radius; the bending forward of this bone so often alluded to; to which may be added the characteristic appearances of all the bones of the hand, particularly of those of the thumb,—all these peculiarities in these specimens were similar to those we have always observed to be present when this chronic disease affected the joints of the wrist and hand.

It is not by any means difficult to distinguish chronic rheumatic arthritis of the joints of the wrist and hand from every other disease of these articulations,—the nodosity of the joints of Haygarth and the rheumatic gout of other writers are familiarly known; but as I would endeavour to establish here, that there is a *local* and a *constitutional* form of the disease as it affects the regions of the wrist and hand, some observations on the *differential* diagnosis between these two species of the same genus seem to be necessary.

In the *constitutional* variety both upper extremities are symmetrically affected; the wrist-joints are stiff and extended, and any attempt to move them is the

source of pain to the patient. In both forms there is the same convexity on the dorsal aspect of the lower end of the radius, and the same concavity in front, and disposition to subluxation forwards of the carpus; the same enlargement of the lower extremity of the ulna: but while, as already mentioned, in the constitutional form the wrist is stiff and rigid, in the local form there is an abnormal laxity of the ligamentous structures, and a susceptibility of partial luxation backwards and forwards of the hand at the wrist-joint, and these movements are not attended with pain to the patient.

In the former, in the aged subject, we usually find the bones of the carpus in a state of atrophy (Atlas, Plate x. Fig. 2), porous, deformed, and in some rare cases fused, as it were, together by bony union; but in the latter the carpal bones seem enlarged; ivory-like deposits are seen, and exuberant bony nodules are formed round the edges of the articular surfaces (see Atlas, Plate x. Fig. 4).

The *prognosis* is unfavourable in both varieties of the disease, as far as relates to the probability of any ultimate recovery occurring. In the constitutional form, it is true that, after existing for a certain length of time, the disease may cease to progress, and the pain subside, but the deformity must remain. In the local form the prognosis is less unfavourable: there is little or no pain, weakness of the wrist is alone complained of; and although the use of the limb is somewhat impeded by the disease, it is never completely suspended.

CHAPTER VI.

THE DISEASE IN THE ANKLE, THE JOINTS OF THE TARSUS, METATARSUS, AND TOES.

THE ankle-joint is very rarely affected by chronic rheumatic arthritis, and the symptoms and anatomical characters it presents, when it occurs in this region, have not been hitherto described.

In those who are affected by this disease in the ankle-joint, the mallcoli, or bony eminences which mark the articulation laterally, are observed to be much more prominent than usual, and the breadth of the space between them seems increased. The joints of the tarsus are usually implicated in the same morbid action, hence the symptoms we notice are seldom referable to the ankle-joint alone; the navicular bone and head of the astragalus, in these cases, project somewhat on the internal margin of the foot; the instep, too, becomes depressed, and the sole flattened. In such cases, also, there is a degree of swelling, the amount of which may be ascertained (if both feet be not simultaneously affected) by measuring the circumference of the tarsus round the instep and sole.

The foot, too, has a peculiarity in its appearance, arising from the projection inwards of the navicular bone and depression of the instep, already adverted to, which give to it a resemblance to the morbid condition called "flat foot."

The ankle-joint is found to be more or less stiff, and if we desire the patient to move it, and at the same time apply the ear close to the joint, the usual crackling or crepitus is heard.

The *medio-tarsal-joint*, that is to say, the articulation formed behind by the astragalus and os calcis, and in front by the posterior articular surfaces of the navicular and cuboid bones,—this transverse joint of the tarsus thus constituted is generally more affected by this disease than any of the other of the articulations of the foot.

In these cases there is an obvious stiffness in this median joint of the tarsus: the patient seems to have lost the usual elasticity in the motion of the affected foot; he never seems to spring from it as he goes up stairs, and as he descends with difficulty each step, we observe him place his heel down suddenly and abruptly. The form and direction of the phalanges of the toes are observed to be changed from their normal state. The metatarso-phalangeal-joint, or ball of the great toe, is generally much enlarged, and the great toe itself is drawn outwards, sometimes to the degree to cross transversely the other toes. The phalanges of the smaller toes become variously distorted; they are also generally arched, the convexity being upwards, towards the dorsum of the foot.

(See Fig. 22, page 254; and Atlas, Plate IX. Fig. 1, c.)

The patient who is affected with this disease of the ankle and joints of the tarsus, &c., has the same general symptoms which belong to this chronic rheumatic disease, in whatever region it is situated. He, therefore, states that he suffers much during cold and damp weather; that when he first gets out of bed in the morning the joints of the affected ankle and feet are stiff, and the movement of them painful to him; that he improves under exercise: he adds, that he is always worse on the day succeeding one on which he has much exerted himself. The patient, too, has occasionally spasmodic pains, which seem to him to start back from the toes towards the ankle-joint and front of the leg. In these well-marked cases of chronic rheumatic arthritis of the ankle and tarsus, &c., some of the other articulations, particularly those of the opposite ankle and foot, as well as of the wrists and hands of the patient, are symmetrically affected,—a combination of things which, when it exists, renders the diagnosis as to the true nature of the malady in the ankle and foot by no means difficult.

As the clinical history of this disease, as it affects the ankle-joints and those of the tarsus, metatarsus, &c., is as yet but little known, it may not be unprofitable here to introduce the following case, which was under our observation in the Richmond Hospital for twelve months.

CASE XIV.

CHRONIC RHEUMATIC ARTHRITIS ENGAGING PRINCIPALLY THE ANKLE-JOINT, THE HAND, THE TARSUS, METATARSUS, AND TOES.

Michael Leonard, aged 38, a house-servant, was admitted into the Richmond Hospital on the 25th of July, 1854. He stated that, while labouring under the effects of intoxication, he exposed himself to cold by sleeping all night during damp weather in a hall, open to the street; that, from this cause, he became affected with a *severe* rheumatic fever, which continued for six weeks, after which time he so far recovered that he felt himself able to resume his ordinary occupation as an inside servant. He continued well for two years, and in 1853, at a time when the Great Industrial Exhibition, in Dublin, had attracted many visitors to the city, he was engaged as a waiter to a hotel. In this service, which proved at the time a most laborious one, he was exposed, when over-heated, to draughts of cold air, and to sudden changes of temperature, while he was also compelled to be constantly "on the foot" from five o'clock in the morning until one after midnight. Having been for two months thus incessantly occupied, his ankles and feet began to swell, and became painful to him; he stated he felt in them a burning sensation. If he sat down for a time, the pains were relieved, but were renewed with increased severity when he again commenced to walk. Subsequently

his hands became affected, and now he felt obliged to give up his occupation as waiter, and he obtained admission into the Richmond Hospital.



FIG. 22.

On viewing his ankles from before, their unusual breadth across between the malleoli first attracted our

notice. The instep seemed depressed, the foot flattened, and the inside of the head of the astragalus and navicular bone were observed to be unduly projecting inwards. The measurement across the tarsus in this situation was found to be, for the right foot $10\frac{3}{4}$ inches, and for the left one a quarter of an inch less. He could flex and extend the foot, but not perfectly, and there was an articular crepitus perceived on moving the right ankle. He stated, that when he walked on a flat surface, as for instance on the flags of the street, both ankles bearing equal pressure, the pain he felt in the inner side of the right ankle was very severe; hence, whenever he could, he contrived in walking to place the sole of the foot most affected on an inclined part of the side of the street or road, taking advantage of any inclination of surface which permitted him to throw the principal part of his weight in walking on the outside of the foot and outer ankle. We observed that he could go up stairs with facility, but that he came down awkwardly: he descended each step very abruptly on his heel, and there seemed to be as little elasticity in this movement as if he walked with a wooden leg.

In short, in going up and down stairs, the foot seemed, so far as related to the functions the anterior part of it usually performs, to be quite passive in these movements: he threw no weight on the tarsus or metatarsus; and on this circumstance seemed to depend much of the peculiarity of the patient's mode of progression. He stated that moderate exercise he

found of use to him, but if he walked much he suffered next day severely. On the other hand, complete repose of the affected joints for any length of time he considered positively injurious. He illustrated this last remark by saying: "I have tried the experiment while in hospital, whether *complete* rest of the joints would be useful to me, and I have found that after continued rest (for instance, for five days) my joints became so stiff that I did not for two days at least recover the same power of motion I had lost by the five days' previous repose." "The pains" he found much influenced by the state of the weather. He added, "that during the *severe frost* of last winter he suffered most severely." He thinks damp equally injurious to him as frost: during warm and dry weather he is always much better. We noticed that during the last six months the patient was visited by occasional exacerbations of pain, heat, and swelling of the ankle and joints of the foot, which would last for two or three days at a time; these were not accompanied nor preceded by any constitutional disturbance, nor could they be referred to any obvious exciting cause; he sometimes had spasms which would "jerk" backwards from the toes to the ankle along the front of the leg. The toes also presented the deformity which is usual in the disease (Fig. 22, also Atlas, Plate 1x. Fig. 1, c, and Fig. 9); they were much elevated or arched above the level of their corresponding metatarsal bones, forming a curve convex on the dorsal aspect of the foot; the metatarso-phalangeal joint or ball of the great toe was enlarged, and the toe directed

much outwards, all the extensor tendons on the dorsum of the foot passing to the toes seemed tense. He complained of wandering rheumatic pains, particularly in the shoulders, and here crepitus was perceptible; the hands, though not now swollen or painful, preserved the characteristic appearance of this disease; we noticed the fingers to be preternaturally extended and somewhat adducted towards the ulnar side (see Fig. 22). He left the hospital on the 10th of August, much relieved of all his symptoms, but still preserving many traces of the disease in his feet and ankles; he was advised to go to the sea-side as a means of improving his general health.

As to the result of the *treatment* in this case, all we have to remark is, that when he was discharged from the hospital he was in every respect much improved. On the 6th of September, 1855, he presented himself again at the hospital. It now seemed to give him much satisfaction to be permitted to show us how much better he could go up and down stairs than he could previously, but the usual deformity of his feet and hands of course remained, and the ear could still detect distinct crepitus in every movement of the right ankle. It may be inferred from the statement made by the patient himself upon the important question whether rest was useful or not, that moderate exercise was on the whole beneficial to him, but that absolute rest and complete repose of all the affected articulations for several successive days, was decidedly injurious.

As to local treatment of the ankles and feet, he found stimulating liniments occasionally of service; he never omitted to use around the ankles flannel rollers. During the occasional short *exacerbations* of the disease he suffered in the ankle and feet, he found considerable relief from the application of carded wool covered closely with oil-silk, and confined by a bandage. Upon referring to his own opinion upon the effects of different medicines which had been given to him, he replied, that he considered that the hydriodate of potash mixture, although he had persevered in its use for two months, did not afford him any benefit; that his own impression was, he derived more decided good from the continued use of the Chelsea pensioner electuary than from any medicine he had taken during his sojourn in the hospital.

ANATOMICAL CHARACTERS OF CHRONIC RHEUMATIC
ARTHRITIS AS IT AFFECTS THE ANKLE, THE TAR-
SUS, METATARSUS, AND TOES.

The changes the structures which enter into the composition of the ankle-joint undergo, under the influence of this disease, will no doubt be found to be analogous to those alterations which the same disease has been known to produce on the other articulations already adverted to, but as the disease has been rarely examined anatomically in this region, our actual knowledge upon the subject in question must be considered to be at present very limited. On this account, the two following examples of this disease

as it had affected the ankle-joints seem to me to be worthy of notice.

In the year 1846-7, I frequently visited a patient in the North Union Poorhouse (M'Garry), who presented in his person a remarkable example of chronic rheumatic arthritis, which had engaged symmetrically almost all the joints of the upper and many of those of the lower extremities, the ankles included. This patient died on the 19th of February, 1848, and through the kindness of Dr. Kirkpatrick, Physician to the institution, I was afforded an opportunity of investigating anatomically the effects of this disease on all the articulations. Omitting in this place any of the other particulars of the post-mortem examination of this case, I shall confine myself to the description I find entered in my notes relative to the appearance the ankle-joints presented. These articulations were not by any means in the same advanced stage of disease that the other joints were found in, but it had evidently commenced, and even had made some little progress in them; the synovial membrane had lost its polish, and the cartilage investing the articular surface of the astragalus had degenerated as to colour, and become of a deep yellow hue. On close inspection this cartilage was found to be thinned, and on its bridge-like upper surface could be discovered very fine but *distinct parallel ridges and grooves*, in the line of flexion and extension of the joint. The bone around the margins of the thinned articular cartilage was in an hyperemic condition, as well as the subsynovial cellular tissue,

which occupied recesses here and there, near the margins of the thinned and degenerated cartilages.

With respect to this patient we may here observe, first, that he had laboured for years under this disease, and latterly had been bedridden from it; and secondly, that the ankle-joints had been only for a short time affected by it. Under these two circumstances, therefore, it was not to be expected that any eburnation of the articular surfaces of the ankle-joint should have been found. As, however, the superior articular surface of the astragalus was thus marked with parallel ridges and grooves, it is plain that a process of disintegration of the articular cartilage had commenced, and we may add the conjecture, that had the patient become well enough to have been able to walk, it is probable that the usual changes would have succeeded to the removal of the cartilage, that is to say, the reticular texture or cells of the bone should have next been exposed, and these last have been ultimately filled up with a stratum of ivory-like deposit, forming a polished surface, marked with the usual parallel ridges and grooves in the bone, in the direction of flexion and extension, the only movements the ankle-joint enjoys.

Dr. Power, Professor of Anatomy to the Royal College of Surgeons, when demonstrating last winter to his class the normal anatomy of the ankle-joint, remarked in one of the articulations he had prepared for this purpose the following abnormal appearances:—The cartilage investing the superior articular surface of the astragalus was marked with

parallel ridges and grooves ; these were so very fine as to require close inspection to see them, but when placed under water they became very conspicuous, and he at the moment directed the attention of his class to them, as well worthy of their notice. Upon examining the inferior articular surface of the tibia, which had been in contact with the astragalus, similar parallel ridges and grooves were equally visible. The synovial membrane in this case, in his opinion, presented nothing peculiar in its aspect, but he considered this sac had contained more synovia than he had usually found on dissection. The history of this case was unknown, but the appearances were so much those the Professor was familiar with, as having often seen in other hinge-joints which had been affected with chronic rheumatic arthritis, that he, therefore, was induced carefully to examine the articular structures of the other articulations in this individual, and he found that almost all, particularly those of the wrists and hands, exhibited the well-known anatomical characters of chronic rheumatic disease.

These two are the only examples I am aware of, in which any traces of chronic rheumatic arthritis have been seen in the ankle-joint,—if I except one other case, which, although the record of it is now dated nearly one hundred years ago, must be considered to have been a case of this chronic rheumatic disease, which had affected many of the joints of the same individual, that of the ankle included. In the Hunterian manuscripts we find an account of this case nearly as follows :—John Hunter made the dissection of the body of an old woman who died in St.

George's Hospital, of whose history, he states, he knew nothing. He found foreign bodies in both her knee-joints, and one of these bodies in her ankle. "On turning down the patella," he observes, "I saw that the cartilage was almost eroded off, both it and the end of the femur, in parallel grooves. I examined the joint *of the ankle*, and observed a piece of bone, about the bigness of a pea, within the cavity of the joint, but attached to the ligament of the joint by a strong ligament; however, it was loose, so as to be moved from side to side. Both these I have prepared."*

Thus, then, many of the ordinary morbid appearances observed in the anatomical examination of the joints of those who had been affected with chronic rheumatic arthritis have been also noticed in the ankle-joints under similar circumstances of disease, with the exception of one characteristic phenomena, namely, eburnation of the surfaces, which, as far as I can collect, has never yet been observed in the ankle-joint. The same observation, however, cannot be applied to the bones of the tarsus, because the medio-tarsal joint,† the neighbouring articulation to

* Catalogue of Museum, College of Surgeons of England, vol. II., p. 235; also Hunterian MS., An Account of the Dissection of Morbid Bodies, page 70, No. 54.

† I have thought we may name this the medio-tarsal joint, that is to say, the double articulation formed behind by the most anterior part of the astragalus and os calcis, and in front by the back part of the cuboid and cuneiform of the navicular bone; we may here observe, that it is in the transverse line of this same articulation that the operation well known in surgery, called Chopart's "partial amputation" of the foot, is performed.

the ankle, has, under the influence of this disease, been known to have had its surfaces completely eburnated, as well as marked by parallel ridges and grooves.

We have had for many years, in our collection at the Richmond Hospital, examples of the effects of this chronic disease on the bones and articulations of the tarsus, more especially on the astragalus and navicular bone; some of these I have delineated (see Atlas, Plate ix. Fig. 11).

Professor R. W. Smith has laid before a meeting of the Pathological Society some of these specimens I allude to, with others besides from his own Museum. On the occasion of his presenting these specimens, he stated that he had never seen the ankle-joint show any traces of this disease, but had frequently noticed the head and neck of the astragalus much deformed by it, and that in a few instances he had observed its effects on the surfaces of the calcaneo-cuboid articulation.

He exhibited three specimens of the astragalus as illustrative of the changes produced by the disease on this bone: the alterations were similar in all, and confined to the head and neck of the bone; in all, a process of bone (see Atlas, Plate ix. Fig. 11, D) had sprung up, from the anterior part of the neck, D, rising above the level of the upper articulating surface of the bone; the anterior surface of this new growth was in all the specimens continuous with and formed a part of the articulating surface of the head of the astragalus. The navicular bones, C, in

each had undergone changes in form, exactly corresponding to that which took place in the head of the astragalus. The hollow glenoid-shaped surface of the navicular bone, and the rounded head of the astragalus, where they confronted each other, were eburnated and marked by parallel ridges and grooves, which might be supposed to be formed by the attrition of the surfaces of the two bones against each other, in the movements of the foot at the mediotarsal joint; the ridges and grooves were directed from above downwards, with some inclination inwards, from the dorsum to the sole of the foot.

Professor Smith concluded his communication by remarking that this was the first time that any examples of chronic rheumatic arthritis of the tarsal bones had been exhibited before the Pathological Society, nor was he aware that the disease had been described before.*

The Professor also subsequently (January 4, 1845) showed a remarkably fine specimen of this disease affecting the joint between the metatarsal bone and the first phalanx of the great toe; the joint was greatly enlarged, forming a tumour, somewhat of a globular shape, and larger than a walnut shell; all the structures entering into its composition were intensely vascular; the bones were of a bright scarlet colour, deprived of their cartilage of incrustation, and grooved in the line of flexion; the end of the metatarsal bone, greatly enlarged, was received into a cavity of a glenoid form, and constituted by three

* "Reports of the Pathological Society," April 22, 1842.

bones,—viz., the end of the phalanx and two sesamoid bones; the long axis of this glenoid cavity was placed vertically, and was nearly two inches in length (see Atlas, Plate x. Figs. 8, 9, 10, and coloured drawing, Richmond Hospital Museum).

The alteration in the direction of the phalanges of the toes has been already described; and as to the anatomical changes induced by this disease, all we have to say is, they are analogous to those we notice in the fingers. There is the same nodosity of the small joints (see Atlas, Plate ix. Figs. 6 and 9), the same displacement of the tendons, which are thrown off the convexity of the curves formed by the toes in the direction of their length.*

* I should not omit here to refer to some observations by Mr. Edwin Canton of London, on this disease as it affects the metatarso-phalangeal joint of the great toe. His remarks remind us, that chronic rheumatic arthritis, as it affects this as well as other joints, demands more attention from the Profession than it has hitherto received. For example, he refers to cases brought before the Fellows of the Medical Society of London so lately as November, 1850, and published in the *Lancet*, as cases of "Luxation of the *Distal Extremity of the Great Toe*," yet the appearances were perfectly characteristic of the rheumatic affection we are noticing: the author of the paper in question, in detailing his experience of the morbid appearances found on dissection of the joint in such cases as he brought before the Medical Society, says: "The synovial membrane breaks up, and in a great degree disappears; the cartilage disappears; lastly, *the extremities of both bones, which were incrustated with cartilage, acquire an ivory surface.*" "Yet has he failed," says Mr. Canton, "to recognise in these appearances the affection as one simply of chronic rheumatic arthritis, as it really was. The other joints of the body should have been examined, and I doubt not that marks of this complaint would have been readily recognised in them."—*Surgical and Pathological Observations*, by Edwin Canton. *Lancet*, vol. II. p. 554. 1850.

CHAPTER VII.

THE DISEASE IN THE TEMPORO-MAXILLARY ARTICULATION.

THE structures which enter into the formation of the temporo-maxillary articulation are sometimes, though rarely, visited by chronic rheumatic arthritis. I cannot discover that any recognised instance of the occurrence of this disease in this joint has been recorded, until Cuveilhier, in the year 1830, published a well-marked example of it, being the case of an individual in whom, besides the temporo-maxillary articulation, both shoulders and hip-joints were symmetrically affected by this disease, called by him "Usure des Cartilages Articulaires," the same affection which I have thought may be more appropriately named "Chronic Rheumatic Arthritis."

"I have never seen" (observes Cruveilhier,* in alluding to this case) "the disease I call *wearing out* (*usure*) of the articular cartilages better marked than it was in the left temporo-maxillary articulation of this individual. The condyle of the lower jaw did

* "Anatomic Pathologique," Liv. IX.

not exist; it might be supposed to have been sawn off horizontally at the line of junction of the head with its neck, and that which remained of the neck had been flattened. The articular part of the glenoid cavity was represented merely by a plane surface; no trace of interarticular cartilage or cartilage of incrustation existed. Both surfaces of the altered articulation *were remarkably red.*" In the above description, Cruveilhier accurately details the anatomical characters of this disease as it affects the temporo-maxillary articulation. We may infer that the symptoms and history of the case were unknown, for he concludes his account of it by observing: "I am persuaded that the old woman who was the subject of the preceding observations had been tormented for a long time before her death with an articular rheumatism, which had principally fixed itself in the articulation of the lower jaw, and in the other joints already specified."

The second recognised example of this disease as it affects the temporo-maxillary articulation, which I am aware of having been brought before the profession, was the case of a female patient of mine, whose history I detailed to the Medical Section of the British Association, which held its meeting at Bristol, September, 1836. On this occasion I exhibited to the Section a drawing* of the above-mentioned patient, which showed that her visage was greatly distorted by the enlargement of the condyle and

* Collection in the Richmond Hospital. (See also Atlas, Plate 1.)

ramus of the lower jaw at the right side, and that her hands also bore evidence of having been affected with the same chronic disease. About four years afterwards this patient died, and I was afforded an opportunity of witnessing the changes which this chronic disease had produced on the temporo-maxillary and the other articulations of this individual. The following is the history of this case :—

CASE XV.

Mary Keefe, aged 30, unmarried, was admitted into the Richmond Hospital in the year 1835. She was altogether disabled from earning a livelihood, in consequence of her having been afflicted with chronic rheumatic disease in most of her joints. Her face was quite awry, her chin slightly advanced, and its central point passed one inch across the middle line towards the left side. The fingers of both her hands, from the metacarpal joints, were in the same manner adducted towards the ulnar side, and strongly flexed, and the first phalanx of the little finger of the right hand was dislocated towards the palmar surface of the last metacarpal bone (see Atlas, Plate VI. Fig. 2). She complained of pains in all her joints, but principally in her wrists, hands, and feet; but I remarked that the toes of both her feet were distorted, and some of them elevated above the level of the rest (see Atlas, Plate IX. Fig. 9). When we interrogated her particularly as to her lower jaw,

she said she had a constant aching in it and in the right side of her face. She also made the usual complaint of the changes in the weather causing an aggravation of her sufferings. She seemed uniformly querulous, and had a sad expression of countenance indicative of suffering. Speaking and eating caused her to feel some pain in her ear and in the articulation of her jaw. To open her mouth completely, she felt was impossible, and she stated that whenever she moved the lower jaw she was conscious of hearing some peculiar noise in her right ear, corresponding with each motion of the joint.

The previous history of her case, we collected from her, was, that she had always resided in a damp cabin in the county of Wicklow, with her parents, who were very poor; that she never had anything the matter with either her jaw or her hands, nor did she remember that she ever had been ill, until about five years before the period of her admission into hospital, when she had been attacked with rheumatic fever, which lasted some weeks only, but from the effects of which she never recovered; in short, from her own account it would appear that the acute attack passed at once into the chronic disease I am describing. Her sufferings becoming daily more extended and severe, she at length came to Dublin for advice, and was for some months in hospital under treatment, which, however, as might have been anticipated in such a case of confirmed disease, was of but little use, and being destitute and unable to support herself, she was transferred to the neighbouring North Union Work-

house. When she had been for about three years an inmate of this institution (during which her disease underwent no improvement), she became suddenly affected, on the 28th of July, 1840, with acute œdema of the larynx, which at that time seemed to prevail epidemically. This attack, after a few hours' duration, proved fatal to her.

Post-mortem Examination.—Having, through the kindness of Dr. Gordon, first procured a cast of her face (see Atlas, Plate I. Fig. 4), the articulation of the lower jaw was then exposed by dissection.

When the thickened capsular ligament was cut into, the condyle of the lower jaw was found divested of all cartilaginous covering, it presented a rough, sebaceous-looking surface; the neck of the condyle was more than an inch long, and was double the size of the neck of the opposite condyle; from its inner side a large bony spicula, about one quarter of an inch long, grew upwards and inwards, immediately in front of the internal lateral ligament (see Atlas, Plate I. Fig. 1). The interarticular fibro-cartilage was altogether removed, as well as all cartilaginous covering, from the articular portion of the glenoid cavity, which was smooth, and expanded to nearly twice its normal size, at the expense of the maxillary eminence and root of the zygoma. The right ramus of the lower jaw, from its angle to the head of the bone inclusive, was not only an inch longer than natural, but was also much thicker than the ramus of the left side, and was also bowed outwards, circumstances which accounted for the swollen appearance

of the right side of the face and the projection of the chin to the left.*

When we contrast those two examples of this affection, the one recorded by Cruveilhier, and the other, as above, by myself,—we find the former to be the case of an old woman in whom, so far as the lower jaw was concerned, a state of atrophy of the bones seemed to have been combined with this chronic rheumatic disease. The author observes: “The condyle did not exist; one might have imagined it to have been sawn off horizontally at the union of the head with its neck.” The glenoid cavity also was nearly effaced, so as to represent a plane surface. But the simultaneous coexistence in the patient of the same disease in four other articulations, viz., in both shoulders and both hip-joints, placed it beyond conjecture, that the disease which affected the temporo-maxillary articulation was identical with that which existed in the four other joints.

With respect to the second case, viz. : that of Mary Keefe, it appears that she was only about twenty-five years of age at the time the chronic rheumatic disease,

* All these appearances are displayed, Atlas, Plate 1.; the enlarged condyle and corresponding large glenoid cavity of the right side are here contrasted with the normal condition of the bones of the articulation of the left side, while the true nature of the disease in the temporo-maxillary joint is, as it were, identified by the drawing in the same plate of the patient's left hand, which bears the stamp of chronic rheumatic disease. The patient's right hand also, and both feet, were symmetrically affected by this disease, as above mentioned. Besides Plate 1. see also Atlas, Plate VI., Fig. 2, and Plate IX., Fig. 9, c, which figures refer to this case.

succeeding to a rheumatic fever, first established itself in her constitution ; it showed itself early in her hands and feet, and was accompanied by those remarkable symptoms which characterize it in whatever joint it may be found. Subsequently the right temporo-maxillary articulation became implicated in the same morbid action which affected the hands, elbows, and feet. The head, neck, and ramus of the lower jaw all became hypertrophied, and the appearances which these altered bones and the enlarged glenoid cavity presented at the time of the patient's death may be strongly contrasted with the account given by Cruveilhier of the atrophied state of all the structures forming the temporo-maxillary articulation in the case adduced by him.

In both cases the disease in all the joints was of the same nature. In the one individual, however, an elderly female, it was combined with an *atrophy* of the bony tissue. In the other, on the contrary, the patient was young, and a state of *hypertrophy* of the osseous structure, so far, at least, as the temporo-maxillary articulation was concerned, was found associated with that morbid condition of this and several other joints which we have denominated chronic rheumatic arthritis.

Professor R. W. Smith has contributed his share towards making better known the anatomical characters of this disease, as the temporo-maxillary articulation has been affected by it. He presented at a meeting of the Pathological Society eleven specimens of this disease, from which it would appear

that in the majority of cases it occurred in old subjects, and that the diseased appearances affected equally in the same patient *both temporo-maxillary articulations*. In some cases he found the glenoid cavity deeper, in others shallower, than natural, and in many instances increased as to its circumference; this enlargement had been accomplished at the expense of the horizontal and transverse roots of the zygomatic arch, more especially of the latter, which in all cases he found to be more or less worn away or absorbed. With other observers he has remarked, that the articular cartilage and cartilages of incrustation were frequently removed; but he had only seen one specimen of porcellaneous deposit on the bony surfaces, and added, that he had not in any case found foreign bodies in the interior of the joint.*

The *symptoms* of this disease as it affects the temporo-maxillary articulation have not as yet been so well ascertained as the morbid results which the anatomical examinations of the different structures entering into the formation of the joint have made known. The patient's attention appears to be usually drawn away from the consideration of this complaint, as it affects the jaw, by the more severe sufferings which he generally endures from its simultaneous existence in some of his other articulations, as the wrists, elbows, knees, &c. Upon particular inquiry, however, we shall learn that the patient complains

* Reports of the Pathological Society, Dublin Journal.

of an incapacity to open the mouth fully, of a stiffness of the joint, and that he hears peculiar and disagreeable noises when the jaw moves.

As in some few cases the condyle and ramus of the lower jaw may be found enlarged and elongated, so in others the neck of the bone may be so much shortened as not to rise above the level of the coronoid process ; hence, it is plainly to be inferred that although an altered position of the chin is a phenomenon to be expected in those cases, no special position of its central point can be referred to as a pathognomonic sign of this disease.

In some rare cases, as in that of Mary Keeffe, there may be an hypertrophy and elongation of the neck of the condyle, as also of the ramus of the lower jaw on one side, and in such a case there must of course be a crooked or distorted state of the lower part of the face, and the chin will point to the opposite side. On the contrary, when the disease affects symmetrically, as it most frequently does, both temporo-maxillary articulations, the chin becomes advanced and elevated as in the old and edentulous subject.

We may learn something of the actual state of the condyle of the lower jaw by carefully examining it as it moves before the external meatus ; indeed, occasionally an obvious enlargement of this bone can be felt, or even seen beneath the zygoma, and in front of the ear.

Anatomical characters.—The anatomy of this disease as it affects the temporo-maxillary articulation,

so far at least as the condition of the bones is concerned, seems now sufficiently well established. It would, however, be desirable that we were better acquainted with the state of the soft parts in the earlier stages of this affection. It must be confessed that the amount of accurate knowledge which we possess on this last point is still deficient, as few opportunities have as yet been afforded to any anatomist to witness them ; it may, however, be safely inferred from what we know of this same disease when situated in the more superficial articulations (as in the knee), that in the first stage of this chronic arthritis there must be some increased effusion of synovial fluid into the interior of the sac or sacs of the joint.

We cannot exactly tell in what stage the interarticular cartilage is destroyed, allowing the surfaces of the bones to become exposed to the effects of mutual attrition, but we believe that in all cases of this disease these occurrences, sooner or later, take place.

This disease in the articulation of the lower jaw produces effects analogous to those found in the other articulations when they have been visited by the same malady. Thus the bony surface of the cavity for the reception of the condyle or head of the bone is found occasionally extended, sometimes deeper or more excavated than natural ; but it is worthy of observation, that although the fundus of the glenoid cavity be thus excavated, it does not seem that any process of thinning or attenuation of the bone takes place. On the contrary, if we hold up between us

and the light a specimen of a temporal bone, the glenoid cavity of which had been affected by this disease, we find that the fundus of this articular cavity is really thicker and less transparent than the sound one.

The condyle or articular head of the lower jaw, under the influence of this disease, assumes various forms, sometimes it is very much enlarged, and the neck which supports it is very much elongated. Sometimes, on the contrary, this neck is shortened, and the head is depressed and flattened out, as it were "forced downwards by the action of some great pressure"* (see Atlas, Plate ix. Fig. 10). Occasionally, as in Cruveilhier's case, the head is almost altogether removed. The interarticular fibro-cartilage, as well as the cartilage of incrustation, has been usually found to have been absorbed, and the porous surface of the bones to be exposed, and to present a red colour.

When describing the anatomical characters of this disease, as they present themselves in all the articulations, I have observed that *eburnation* of the articular surfaces was an ordinary phenomenon, and that "foreign bodies" were occasionally to be found in the synovial sacs of all the joints. It would appear, however, that eburnation of the bony surfaces of the articulation of the lower jaw has as yet been seldom observed. Professor Smith, in commenting on his specimens, says he had only in one instance seen anything like porcellaneous deposit on these surfaces. In

* Page 81, *ante*.

looking over the valuable collection contained in the Museum of St. Bartholomew's Hospital, I observed an example of this eburnation in one of the temporo-maxillary articulations, which, I have no doubt, was the result of chronic rheumatic arthritis. The following is an abstract from the notice in the Catalogue of this preparation : "There has been disease in one of the articulations of the jaw, producing *absorption of the articular cartilage, with a deposit of bone on the circumference of the glenoid cavity.* The corresponding condyle is in part removed by absorption ; its surface is rough, except in one point, where it is highly polished, and has an *ivory-like texture,*" &c.*

I am not aware that "foreign bodies" have been found within the synovial sac in any case in which the temporo-maxillary articulation had been affected with this disease, if I except one case which is alluded to by so old an authority as Baron Haller,† which in my opinion was clearly a case of chronic rheumatic disease.

The Baron in his "Elementa Physiologiæ," says that the articulation of the lower jaw, on account of the constant motion it is subjected to, in talking and eating, suffers much from the effects of attrition. In one old woman, he adds, I have not only found the interarticular cartilage perforated, but at the same time the cartilaginous incrustation of the glenoid cavity was altogether removed from this place,

* Catalogue, vol. 1 p. 71, A. 87.

† Haller's "Elementa Physiologiæ," vol. vi. page 9. An. 1764.

and seemed to have been formed into twenty small bodies (glebulas), which were found contained within the capsule of this articulation.* Although the correctness of the theory here given as to the mode of formation of these small bodies alluded to, may well be questioned by the modern physiologist, still, in my opinion, the removal of the cartilage of incrustation, the disintegration of the interarticular fibro-cartilage, and the numerous foreign bodies found contained within the capsular ligament of the lower jaw, all these seem to point out the disease in the case of the old woman mentioned by Haller to have been one of chronic rheumatic arthritis.

* Alluding to the interarticular cartilage, Haller says: "Pertinet ad frictionem impediendam. Ob perpetuum enim in loquendo et edendo motum, hæc articulatio magnam adtritionem patitur, neque solum meniscum perforatum, sed omnino crustam cartilagineam ossis temporum in vetula detritam vidi, inque viginti fere glebulas collectam quæ capsula articuli comprehendebantur."—*Haller's Elementa Physiologiæ. Loc. cit.*

CHAPTER VIII.

THE DISEASE IN THE STERNO-CLAVICULAR AND ACROMIO-CLAVICULAR ARTICULATIONS.

THESE articulations being the centres to which are ultimately referred almost all the movements of the upper extremities, it may be readily supposed that they occasionally become liable to suffer (particularly in the labouring classes) from *over work*; under such circumstances one or both of the extremities of the clavicle enlarge, and, as they are superficially situated, the swelling soon becomes conspicuous, either on the superior margin of the sternum or summit of the shoulder, or perhaps in both these situations at the same time. These swellings, or “nodosities,” would seem, in many cases, to consist merely in an hypertrophied condition of the bone and other structures of the articulations of the clavicle. Under these circumstances they can scarcely be considered morbid in themselves; nevertheless, they seem to consist in a condition of things which, I have no doubt, frequently predisposes the joints to become secondarily affected with the chronic disease we are

here considering, and in this case we shall find that, to the enlargement above alluded to, there are superadded other symptoms; for example, the patient will complain of pain on motion, stiffness of the articulations after exercise, weakness of the upper extremity corresponding to the side of the affected clavicular joints; and, in short, all the ordinary symptoms of chronic rheumatic arthritis may make their appearance in these joints.

When it has commenced in an hypertrophy of the structures constituting the joints of the clavicle, I have in general observed it to assume the *local* form; on the other hand the disease is observed frequently to affect the clavicular joints on both sides of the body symmetrically; and when this is the case it will be found that the disease has a constitutional origin, and that many of the other articulations, besides those of the clavicle, are also similarly affected. It is to be observed, that one of the acromio-clavicular joints may be the seat of this disease without any implication of the neighbouring shoulder-joint, but that the latter is seldom affected (whether the disease be of the local or constitutional form) without the former being also drawn into the same morbid action.

Diagnosis.—The enlargement of either the sterno or acromio-clavicular joint in certain cases, when the history of the case is involved in obscurity, may by possibility be mistaken for a luxation of the clavicle, either at its sternal or acromial end, as the case may be. However, when the sternal end of the clavicle

is luxated, it is thrown forward in advance of the sternum, and is approximated abnormally towards the median line. Moreover, this extremity of the clavicle will be found to be very moveable when luxated, a state of things which may be well contrasted with the unchangeable condition of the nodosity, or hard swelling of the sternal articulation of the clavicle, which exists when this joint is the seat of chronic rheumatic arthritis.

If the acromio-clavicular articulation be affected with this disease, it may, it is said, be mistaken for a luxation of the acromial end of the clavicle, but when chronic rheumatic arthritis is the cause of the symptoms, we notice that the hard swelling does not yield at all to pressure, that it remains habitually of the same size, and at the same level. On the contrary, if dislocation of the acromial end of the clavicle be the cause of the swelling, this will be found to vary with the position of the patient ; for example, if we desire him to lie down in the horizontal position, as in bed, and then suddenly to rise up again into the sitting posture, in the former attitude the swelling partially disappears, to recur again, with its previous elevation above its normal level, in the latter or sitting posture. The diagnosis, then, between this disease and the ordinary dislocations the extremity of the clavicle is liable to, does not appear difficult, even when the previous history of the case is unknown.

As these two articulations of the clavicle have such important relations to the movements of the upper

extremity, as already mentioned, we can readily infer that when either joint is affected with chronic rheumatic arthritis, the functions of the upper extremity of the corresponding side must be greatly impaired. I may here mention that I had lately under my care, in the Richmond Hospital, a patient affected with this disease of the right acromio-clavicular joint, whose occupation, as butler, had made it necessary for him to exercise much his upper extremities in burnishing plate, and in carrying to and from the dinner-table heavy dishes. As in this case the disease of his right acromio-clavicular articulation increased, he complained of pain on every motion, and of weakness of the upper extremity of the affected side, and at length he became so unable to perform the ordinary duties of a house-servant, that at the age of 52 he felt compelled to give up his occupation altogether, and seek admission into hospital.

ANATOMICAL CHARACTERS OF THE DISEASE AS IT AFFECTS THE STERNO-CLAVICULAR AND ACROMIO-CLAVICULAR ARTICULATIONS.

When we remove the integuments covering the capsular ligament of the sterno-clavicular joint, on making the post-mortem examination of an individual who had been affected by this disease in this articulation, we find that the fibrous capsule is remarkably strong and hypertrophied. The interarticular cartilage is removed, as well as that

of incrustation, which had invested the articular surfaces. The bones present a red appearance, and some red synovial fimbriæ are usually found to exist in some of the small recesses of the articulation. The sternal extremity of the clavicle is much enlarged, and the outline of its articulating surface is circumscribed with exuberant osseous granules, which form a corona round the bone. This articular surface is convex, and of an ovoidal shape. The posterior and inferior surface of it corresponds to the fossa formed for the clavicle on the superior margin of the sternum, and here the clavicle is sometimes found to present a point of eburnation.

I have had delineated from our collection in the Richmond Hospital Museum a specimen, which shows the ordinary effects of chronic rheumatic arthritis on both the sternal and acromial end of the clavicle (see Atlas, Plate ix. Figs. 2, 3, 4, 5). We also possess a cast in our collection, which well exhibits the external appearance the acromio-clavicular joint presents, when affected by this disease (Atlas, Plate ix. Fig. 6).

Professor Smith laid before a meeting of the Pathological Society of Dublin some specimens, which were the result of chronic rheumatic arthritis of the articulation between the clavicle and acromion process, together with the above-mentioned cast. In almost all the specimens the outer extremity of the clavicle was remarkably prominent, rising above the level of the acromion process. The articulating surfaces were greatly enlarged, the

vertical diameter of that on the acromion being nearly three-quarters of an inch ; they were destitute of cartilage. The articulation was surrounded with a capsule of great strength and thickness, and contained a plate of calcareous matter, and in the interior of the joint were a few foreign bodies. The interarticular cartilage had disappeared. The external appearance of the joint resembled in some respects those of luxation of the outer end of the clavicle.*

* Reports of the Pathological Society, Dublin Journal.

CHAPTER IX.

THE DISEASE IN THE SPINE.

THE articular surfaces by which the vertebrae of the spinal column are united to each other sometimes become affected by this disease, and it is in this case usually a constitutional malady. In some, the joints of the extremities are equally implicated with those of the spinal column, and then the condition of the patient is rendered truly miserable: he is incapable even of feeding himself, and becomes totally dependent on others. Dr. Robert Todd, of London, gives us the account of a patient of this class, a girl, aged 25, who was an inmate of the Wadsworth Union Workhouse; she was a complete martyr to this chronic rheumatic affection in all her joints, even in those of the *cervical vertebrae*. She was so crippled that it was found necessary to construct machinery in order that she might be lifted out of bed.*

The patient afflicted with this disease in the spine complains of stiffness in his neck, back, and loins, of rheumatic pains, increased by every change in the

* See Todd on Gout, &c., page 180.

weather. If the *cervical* vertebræ be the seat of the affection, a craekling noise is heard on motion, verifying the remark made by the earliest observer of this disease, Haygarth, who says: "In a few patients a crackling noise is perceived on motion, particularly in the neck." The rotatory movement of the first vertebra on the second, permitting the patient to turn his face from side to side, is usually preserved, while the rest of the cervical region seems stiff and rigid. When the *lumbar region* is affected, the power of extension of the spine, or even standing completely erect, becomes difficult. When the *dorsal* vertebræ are the seat of this disease, the back is rendered much more convex posteriorly than natural, the chest seems sunk in, and the figure becomes not only stooped and bent forwards, but an absolute diminution of the length of the spinal column and height of the patient has been observed to have taken place.

Some of the articulations of the lower limbs in these cases may be so far affected, that the patient's powers of progression may be greatly impaired, or even prevented altogether; but I would here wish to be understood to say, that there is really nothing in the affection of the spinal column itself, or in its joints, calculated to prevent the patient moving slowly about. Vibratory motions of the column, or jars, such as are produced by travelling in ordinary vehicles, do not so much incommode the patient as might be apprehended. Indeed, if we make the experiment, we shall find we can place the palm of the

hand on the vertex of the patient's head, firmly press down, and even give a species of succussion in the longitudinal direction to the whole spinal column in these cases, and yet this force, thus applied, while the patient is either sitting or standing, shall not cause him pain. We may here remark, that by such an experiment as this last, we can readily distinguish this disease from articular caries of the vertebræ, with which it might by possibility be confounded, for we know that a patient threatened with articular caries of the vertebræ will shrink back from permitting the slightest pressure being made in the direction of the axis of the spinal column, much less will he allow any jar or shock to be communicated to it.

ANATOMICAL CHARACTERS OF THIS DISEASE AS IT
AFFECTS THE VERTEBRÆ.

Our experience corresponds with that of Mr. Canton and Professor Smith, that the traces this disease leaves in the structures which compose the spinal column are more frequently found in the cervical and lumbar than in the dorsal region of the spine ; in short, we find that those portions of the spinal column which in the normal state enjoy most motion are those which are most liable to this disease, and hence it is that our museums will be found to contain more specimens of the lumbar vertebræ thus diseased than of the dorsal, and most of all of the cervical. We may, moreover, observe that the atlas and dentata have more free motions on each

other than any of the other vertebræ enjoy, a circumstance which may account for the observation that we are accustomed to see more numerous specimens of the effects of chronic rheumatic arthritis on these vertebræ than on all the others of the spine taken collectively.

Professor R. W. Smith made a communication, which has not been published, to the Pathological Society of Dublin, with a view, he stated, to record some facts he had collected to illustrate the pathological anatomy of this disease as it affects the bony structure of the spinal column; he specially called attention to its effects on the surfaces of articulation between the atlas and dentata or second vertebra, and exhibited some specimens showing that the small and plane articular facet on the atlas, formed for contact with the anterior portion of the odontoid process of the second vertebra, was much increased in size, and converted into a deeply concave oval fossa (A, A Fig. 23).

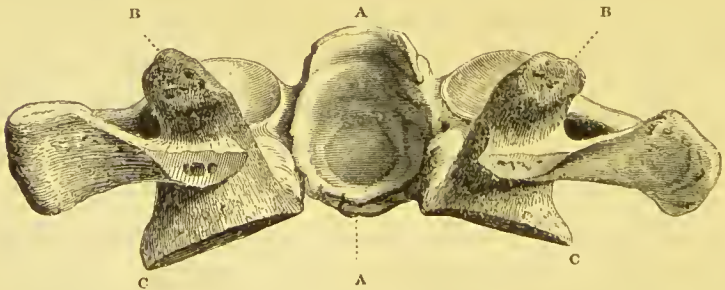


FIG. 23.

Atlas viewed from behind; the spinous process removed to exhibit the enlarged articular facet A, which had corresponded to the front of the odontoid process. B B superior articular process. C C superior articular process.

From the upper margin of this little articular surface, a bony process has been observed to grow and turn backwards, so as partially to overlap the odontoid process.

The Professor produced six specimens in which this disease had left its traces on the *second vertebra*, more especially on the odontoid process; this, at its basis, where it is connected with the body of the second vertebra, was rendered perfectly cylindrical, polished all round, and eburnated from the effects of the rotatory action of the first vertebra on the second. The odontoid process was also, in most of these six specimens, much hypertrophied, and prolonged upwards for half an inch above its ordinary level, towards the foramen magnum.

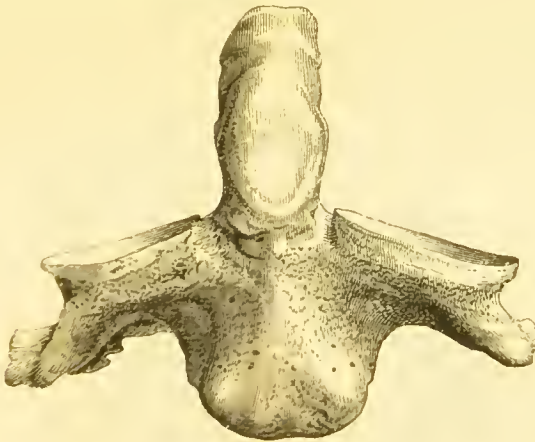


FIG. 24.

The second vertebra viewed from before; atlas removed; odontoid process much hypertrophied.

It was also shown that the articular processes of all the vertebræ became affected by this disease. In one specimen the inferior oblique process of the right side of the first vertebra was so much enlarged as to encroach somewhat inwards on the spinal

canal, and outwards on the foramen for the vertebral artery (see Fig. 25). (It is not known that any



FIG. 25.

Atlas viewed from below.

symptoms which might be supposed referable to such a state of things have ever been observed.) In a second specimen presented by the Professor, the



FIG. 26.

Second vertebra viewed from above: A, odontoid process; B, superior articular process.
C spinous process.

superior articular process of the right side of the second cervical vertebra was so much enlarged that it equalled in circumference that of a shilling; all cartilage of incrustation had been removed from its surface, which presented in part a polished and in part a porous appearance; this oblique articular process was surrounded with a rim of bone, B, Fig. 26, and had extended itself outwards, and even so much posteriorly as to encroach a little upon the spinal canal, but at the same time not to the extent in any way to interfere with the medulla spinalis.

As to the *dorsal* and lumbar vertebræ, analogous changes to those here noticed in the cervical vertebræ have been observed; the cartilage is replaced by the ivory-like deposit on the articular surface of the oblique processes. This surface we find grooved vertically in the line of motion of these oblique processes, as they glide upwards and downwards on each other in the motions of flexion and extension of the spinal column.

CASES.



CASE XVI.

CASE OF CHRONIC RHEUMATIC ARTHRITIS IN BOTH ELBOW-JOINTS.

THE following example of this disease has been recently subjected to our observation, and the relation of it here may further serve to illustrate the symptoms and pathological anatomy of this disease:—

J. Donnelly, aged 70, a labourer, on the 5th of August, 1856, fell from the summit of a high hayrick to the ground: he received an injury of the spine, attended with complete paralysis of the lower extremities. He was immediately conveyed to the Richmond Hospital, and placed under my care. He was not long here before my colleague, Dr. Fleming, called my attention to the abnormal condition of both elbow-joints of the patient, which had been enlarged, it appeared, for years, but of

which, however, the patient had never reason to complain. Upon examining the right elbow, I found that the anterior region of the joint was deformed by two large prominences—the one corresponding to the situation of the coronoid process of the ulna, and the other externally, as well as anteriorly, to that of the enlarged head of the radius. When the elbow was grasped round by the hand, and the thumb placed in front of the hard swelling corresponding to the head of the radius, and the fore-arm rotated, it was remarkable how superficially the head of the bone was felt to roll. These movements were always attended with the characteristic articular crepitus usual in this disease, and caused the patient no inconvenience whatsoever.

The joint presented many of the symptoms and appearances of a dislocation of the head of the radius forwards. For example, the fore-arm could not be fully extended; and when flexion was carried to a certain point, a sudden check to further flexion was felt deep in the joint, as if one bone struck against another. Pronation was tolerably free, but supination was limited, and whenever carried to a certain point, an equally sudden stop to all further movement in this direction occurred.

Upon reference to the opposite elbow, we found very nearly the same condition of things here, only that the prominency of the head of the radius on the outside and upper extremity of the fore-arm was

not quite so conspicuous in this arm as in the right.

It might have been imagined for a moment that these symptoms were the result of accidental luxation; but from the circumstance of the opposite elbow-joint being in a similar state, we were at once precluded from falling into any error of diagnosis of this kind. Besides, the patient himself, though not then in a state to enter into particulars, was evidently anxious to make us understand, that whatever was to be observed in his elbows now had been equally the case for many years previously; and to assure us, that if we thought we then perceived anything wrong with them, it never in any way had interfered with him doing his ordinary work.

On the eleventh day after the occurrence of the accident the patient died of the injury done to the spinal marrow.

The right elbow-joint was removed for examination, a cast having been previously taken, to preserve the external appearance the joint presented.

The *capsular ligament* seemed stronger and thicker than natural. There was no regular coronary ligament for the head of the radius, but it would appear as if the fibres which had composed this structure had been spread out so as to form a capsule for the radio-humeral joint. When the elbow-joint was opened, the lower extremity of the humerus was seen to have lost altogether all appearance of its

capitulum. This little rounded head, or capitulum, was not only removed altogether, but the space it had occupied was somewhat excavated, to receive the corresponding head of the radius. The eburnation of the surface here, Fig. 27, A, was very complete. In front of the humerus, immediately above this eburnated portion of bone, an abnormal depression, B, was seen; while the fossa which normally exists immediately above the trochlea, D, of the humerus, for the reception of the coronoid process of the ulna, was filled up by ossific deposit, C.

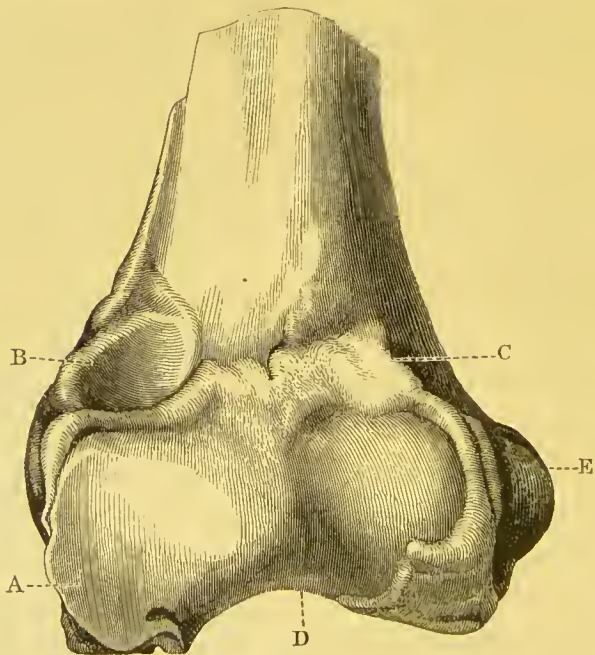


FIG. 27.

Lower extremity of right humerus; A, eburnated cavity in the situation of the former capitulum; B, new depression for radius; C, new ossific deposition; D, trochlea for ulna; E, internal condyle.

The head of the radius was greatly enlarged, and had a deep circular rim or corona surrounding it.—
A, Fig. 28.

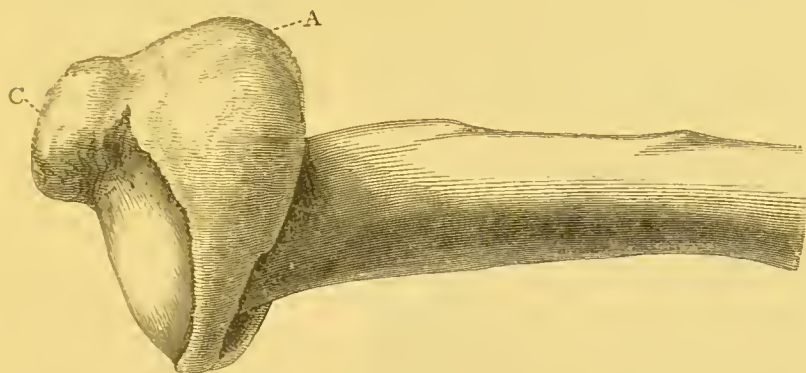


FIG. 28.

The head of the radius, greatly enlarged, with a deep rim and exuberant corona surrounding it, A.

When we looked down on its superior articular surface, we noticed its perfectly circular outline, which was fully an inch and a quarter in diameter, and from this surface; which was somewhat convex, and completely eburnated, arose a little mamillary process, C, which was also eburnated. It

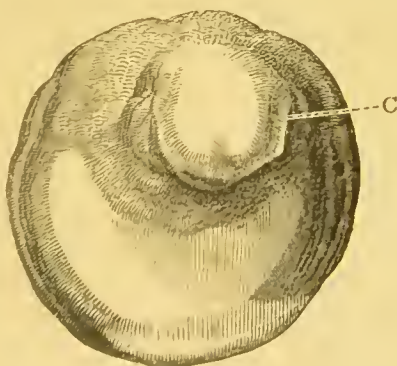


FIG. 29.

Head of radius, articular surface viewed from above; C, new nipple-like process, which, in full flexion of the elbow, corresponded to another eburnated surface, Fig. 27, B.

was this process which, in the flexed condition of the joint, corresponded to the abnormal depression existing in the humerus immediately above the original seat of the capitulum.—(Fig. 27, B.)

Ulna.—The articular surface of the ulna was also greatly enlarged—indeed, it was twice its natural size. This surface was eburnated in some points.

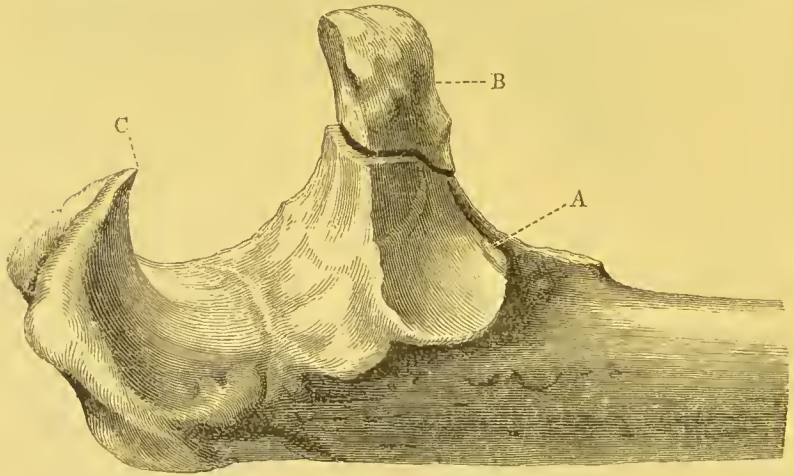


FIG. 30.

Right ulna, viewed externally, radius removed; A, lesser sigmoid cavity for articulation with radius; B, additamentary bone; C, a sharp point of new bone, which seems to have been added to olecranon process. The great scaphoid cavity was much larger and more concave from above downwards, and more convex transversely, than natural.

The coronoid process had superadded to it in front an *additamentary bone*, B. The summit of the olecranon process, C, was preternaturally sharp and pointed. The internal margin of the great sigmoid cavity was studded all round with small ossific deposits.

We were not permitted to prosecute the post-mortem examination further, nor to inspect the

interior of the opposite elbow-joint; but it is more than probable that we should have found that these articulations resembled each other as accurately in their internal structure as we already knew they did in their external form, as well as in the symptoms of chronic rheumatic arthritis which both equally presented.

From this examination it appears that the two conspicuous prominences which, in the living patient, deformed the region of the elbow, were caused by the enlarged head of the radius, and additional growth anteriorly of the coronoid process of the ulna. The sudden check felt on flexion of the forearm when carried to its utmost (resembling what we notice in cases of dislocation forwards of the radius), was caused by the collision between the nipple-like process, *c*, Fig. 28, and the depression, *b*, Fig. 27. It is to be observed that the contact between this eminence and depression prevented the coronoid process of the ulna reaching the front of the humerus; hence the ordinary depression above the trochlea of the humerus anteriorly, for the reception of the front of the coronoid process, was no longer maintained, but, on the contrary, was filled up with osseous depositions.—(Fig. 27, *c*.)

It is remarkable, that with such an amount of apparent alteration in form and structure, there should have been so little real impediment felt or complained of in the performance of the functions of the elbow-joint by this individual.

Such cases as the foregoing seem to me to be ana-

logous to those of the wrist-joint (page 242), in which the lower extremity of the ulna had been found greatly hypertrophied, and the wrist-joint also much altered in form; the individuals having been able to continue their labour to the last, without complaining or seeking medical advice, and generally attributing the deformity of the joint merely to continued labour and over-exertion. It is of analogous cases to this, I imagine (only affecting the wrist-joint instead of the elbow), that Dupuytren speaks when he says—"Les sujets atteints de cette incommodité réclament rarement les secours de la médecine; le peu de gêne qu'entraîne cette lésion la leur fait supporter aisément, et n'est pas assez grande pour les contraindre à interrompre ou cesser leurs travaux."*

* Leçons Orales, tom. iv., page 210.

CASE XVII.

CASE OF J. LYNCH—EXAMPLE OF CHRONIC RHEUMATIC ARTHRITIS OF BOTH KNEE-JOINTS, WHICH CONTAINED NUMEROUS FOREIGN BODIES CONNECTED WITH THE VARIOUS ARTICULAR TEXTURES—ABNORMAL MOBILITY OF THE LEFT KNEE-JOINT—POST-MORTEM EXAMINATION—ATLAS, PLATE VIII. FIGS. 2, 3, 4.

JAMES LYNCH, aged 30, labourer, was admitted into the Richmond Hospital in March, 1837, in consequence of both his knee-joints having been affected with chronic rheumatic arthritis. He had then no pain in them, nor was there any constitutional disturbance of his system observable. In his right knee-joint there was a foreign body, which heretofore had been the source of frequent distress to him; but latterly it never incommoded him: he was, however, entirely incapacitated from following his ordinary occupation as a labourer, in consequence of the very lax and weak condition of his left knee; and it was principally on account of this last that he had at this time obtained admission into hospital, under the care of Dr. O'Beirne.

Right Knee.—He stated that he attributed the origin of the complaint in this joint to a severe wetting he got some years ago, after which, on the very next day, he felt some uneasiness in it,

not amounting to pain, and some stiffness in its movements. These symptoms, we learned from him, were soon followed by a considerable soft swelling of the joint, which, no doubt, arose from effusion into the synovial sac of the articulation. He stated, that after many weeks the swelling became less; but that although he was not rendered by the complaint incapable of following his ordinary occupation, yet the stiffness he felt on moving about when he first left his bed each morning still continued: he felt also injurious effects from sudden changes of the weather, and noticed "cringing noises" in the joint, such as now can be observed whenever the knee is moved. At the time of his admission, the soft swelling (*hydrops articuli*) which he described as having heretofore existed had now entirely disappeared; and although the bones of the joint could be felt to be somewhat enlarged, still it appeared to perform its functions tolerably, with the exception that there was some stiffness in its motions. On examining the surface of the joint, our attention was directed to its internal side, where, near to the junction of the internal condyles of the tibia and femur, a little rounded body, about the size of a hazel-nut, could be seen to elevate the skin, and could be felt through it: it seemed quite superficial, and could be grasped between the finger and thumb and moved about to a certain small extent, so as to give the idea that it was within the synovial sac, and was attached by a membranous pedicle to the bone. The history the patient gave us

of this foreign body was, that at an early period of his illness, and at a time when he was free from any complaint in the opposite knee, as he was one day running across a field, he fell down suddenly; and when he got up he felt, for the first time, this small body at the inside of the knee; and that this afterwards often unexpectedly interposed itself between the articular surfaces, and whenever this occurrence took place, it caused him instantaneously to fall down.

The first sub-inflammatory attack of this joint (1833), we learned, was successfully combated by the ordinary treatment, and the occasional inconvenience he had suffered from this foreign body interposing itself between the articular surfaces was completely obviated by the constant use of a fine flannel roller, which he had been taught to apply methodically around the joint.

Left Knee.—The inflammation which attacked the left knee-joint was very different from that which affected the right in its commencement and early part of its course; although in the end it seems to have partaken of the same morbid action as that which influenced the condition of the right knee, that is to say, it became ultimately affected by chronic rheumatic arthritis.

The patient attributed the origin of the complaint in this knee also to a severe wetting. There was at first a slight pain felt in the knee, which was soon followed by the ordinary signs of a most severe attack of *acute arthritis*, with considerable effusion into the

synovial sac of the joint. This first attack in this joint, after six weeks had passed, partially yielded to active treatment he was subjected to in this hospital two years ago (1835), consisting of cupping, blistering, and a course of calomel, urged so far as to produce salivation; but the patient was not more than just convalescent from this acute attack, when one of a nature very different set in;—for example, he now complained of a constant boring pain deep-seated in the interior of the left knee-joint. This pain became worse at night, and the slightest movement of the joint was the source of excruciating torture to him. Hectic fever also attended; and it was not until after some months had passed that these symptoms yielded, when the patient left the hospital for a time for the country, and on his re-admission (March, 1837), we found that he had now no heat or pain of any kind in the knee-joint, whether in motion or at rest. We could press the patella down on the trochlea of the femur, and forcibly press against each other the condyles of the tibia and femur—as, for example, when we resorted to the ordinary experiment of percussing the heel from below upwards, such manœuvres proved the source of no pain to the patient. We may also add, that all irritative fever had entirely subsided, from all which it was plain that now no acute arthritis, nor chronic “ulceration of the cartilages” of the joint existed. Unfortunately, however, this (the left knee) joint was abnormally movable in all directions, and useless to him. When he at-

tempted to stand, his left knee-joint yielded, the femur projecting inwards, and the tibia outwards ; —in a word, the bones of this articulation seemed merely connected together by the integuments and tendons of the muscles, and it appeared as if all ligamentous connexion had been relaxed or destroyed. In consequence of this state of the left knee-joint, the man required the aid of crutches to enable him to move about.

It is plain from the history of the chronic affection of the *right* knee-joint, the passive synovial swelling (Hydrops articuli) by which it commenced ; the stiffness and uneasiness, influenced by the state of the weather, the “cringing noises” heard on motion, &c., &c. ; that this articulation presented an ordinary example of chronic rheumatic arthritis.

With respect to the *left* knee-joint it would appear to me, that after the attack of *acute* inflammation and the sequelæ belonging to it had ceased, then chronic rheumatic arthritis became established in this joint also, a circumstance which need not excite surprise, considering that in this patient this was the diathesis which seemed evidently to prevail.

The weakened joint was supported by the methodical application of leathern splints and knee-caps ; but although the patient derived some advantage from these appliances, yet, when he was discharged from the hospital as well as it was practicable to make him, he found himself incapable of earning

his livelihood as a labourer, and was, therefore, compelled to seek an asylum in the neighbouring North-Union Poorhouse, where he lived for four years only. His knee-joints underwent no change, but a chronic disease of the bladder having come upon him, he died of this in January, 1842; and I took the opportunity of laying the history of the case, and the post-mortem specimens of the affected knees, before a meeting of the Pathological Society of Dublin held about this date.

POST-MORTEM EXAMINATION OF THE KNEE-JOINTS.

Right Knee-joint.—The capsular ligament was thicker than natural, but contained no effusion. The condyles of the femur presented, along the margins of the articular surfaces, bony vegetations, the characteristic marks of this disease.—(See Atlas, Plate VIII. Fig. 2.)

The anterior and external margin of the outer condyle of the tibia was in part circumscribed by a rim of bone, which was raised somewhat above the level of the articular surface, presenting an appearance similar to that already adverted to, page 216, and there delineated, Fig. 11, c. The inner condyle of the tibia seemed to have been obliquely carried away, and its place occupied by seven or eight rounded additamentary bones. Where these rested on, or were supported below by the tibia, this bone presented exostotic growths projecting in front, as well as behind also, towards the popliteal space. The

additamentary bones, some of which were as large as carpal bones, were overlaid above towards the joint by the internal semilunar cartilage, which was *much hypertrophied*. This fibro-cartilage, therefore, instead of having been either partially or completely removed—the usual result of this disease—was, on the contrary, found to have attained to twice its ordinary dimensions (see Atlas, Plate VIII. Fig. 2; also Fig. 4). Connected to the inner side of the internal condyle of the femur, by means of a slender ligament above an inch long, was seen the foreign body which had been felt on the inside of the knee during life, and had been at first the source of much inconvenience to the patient.—(See Atlas, Plate VIII. Fig. 2, B.) The patella was thicker and heavier than natural, and its margins were studded round with new bony nodules.

The left Knee-joint.—This joint, of course now, as during life, presented great abnormal mobility in all directions, as if the articular surfaces had been merely held together by the integuments and tendons of the muscles. The capsular ligament was thickened, and contained but little synovia. The cartilage of incrustation had been partly removed, and the articular surfaces of the condyles of the femur presented many granular nodules of bone, irregularly spread over their surface. The trochlea for the patella was marked by four parallel ridges and grooves (see Atlas, Plate VIII. Fig. 2) corresponding to similar ridges and grooves existing on the back part of the patella. These

were formed by the mutual action of the bones divested of cartilage on each other, and ran in the direction of the flexion and extension of the joint, and are, no doubt, characteristic marks of chronic rheumatic arthritis. The lateral ligaments were elongated, and the *crucial ligaments had lost all attachment to the tibia*. The semilunar cartilages were perfect, but had attached to them, here and there, foreign bodies, some of which were bony. The external condyle of the tibia was normal, but the internal condyle was deeply excavated, and formed an oval cup, its long diameter from before backwards measuring two inches and a quarter. The surface of this oval excavation had been covered partially with a normal semilunar cartilage; but the cartilage of incrustation no longer existed, and the surface of the condyle presented numerous fissures running deep into the osseous tissue, bearing evidence of a commencing process of disintegration of the bone, which was remarkably light. The bones entering into the formation of both knee-joints in this individual were, in their recent state, observed to present in their interior, when exposed by the section made by the saw, an intensely red colour. They were preternaturally vascular from the effects of pre-existing chronic disease, and in a state of atrophy from want of use.

The lengthened condition of the lateral ligaments, and the depth of the excavation of the internal condyle of the tibia, must have contributed to the abnormal mobility of the knee-joint noticed; but this

condition, which had been so much complained of by the patient, was, no doubt, principally due to the loss of the tibial attachment of the crucial ligaments.

We have been frequently reminded, during the course of the preceding observations, of foreign bodies having been noticed to exist within the synovial sac of the knee in cases of chronic rheumatic arthritis of this articulation; and the *right knee-joint*, we see in the foregoing case, presents us with an example of this disease, in which, besides the numerous foreign bodies which were concealed during life within the recesses of the joint, there was one which frequently interposed itself between the articular surfaces, so as to cause much inconvenience to the patient. Now, it appears to me that the possibility of a repetition of such a state of things should be borne in mind by the surgeon; for we know that he is occasionally consulted on the subject of the propriety of removing, by an operation, foreign bodies from the knee. Let him, however, before he decides upon performing such an operation, have previously ascertained that chronic rheumatic arthritis does not at the same time exist in the joint in which is contained the foreign body it is proposed to remove. And here I may take this opportunity of expressing my belief that the excision of a foreign body from the knee-joint (at all times hazardous, though occasionally called for) can never be considered justifiable when this foreign body is the product of the chronic rheumatic ar-

thrititis still existing in the joint. In the palliative plan adopted in the foregoing instance will, I imagine, be found to consist all the surgical treatment which can be safely resorted to in such cases.

As to the disease in the left knee in this case of Lynch, the most remarkable symptom presented seems to have been the *abnormal mobility* of the joint. This, many will be inclined to believe, depended, not on the chronic rheumatic arthritis which existed when the patient was last admitted into hospital, but on the previous attack of acute arthritis of the knee, and its immediate sequelæ, of which we have given an account; and it must be admitted that there may be grounds for such an hypothesis. Nevertheless, I may here remark, that an *abnormal mobility* of a joint is not a very uncommon complication to be observed in cases of chronic rheumatic arthritis. I have already adduced an example (p. 120), in which the head of the humerus was susceptible of much abnormal mobility at the shoulder-joint; and in the following case, which is at this moment under my care in the Richmond Hospital, not only the articulation of the left shoulder, but that of the left knee, also presents a remarkable exemplification of this *abnormal mobility* here alluded to; and in this case there is no reason to suspect that any other affection of the joints than chronic rheumatic arthritis had previously existed in either of the affected articulations.

CASE XVIII.

CHRONIC RHEUMATIC ARTHRITIS OF THE SHOULDER
AND KNEE-JOINT, WITH REMARKABLE ABNORMAL
MOBILITY IN BOTH OF THESE ARTICULATIONS.

J. STAFFORD, aged 48, cabinet-maker, was admitted into the Richmond Hospital on the 2nd of September, 1856. He is a pale, rather delicate-looking man, who seems to have led a laborious life. His left knee-joint is much swollen from effusion into the synovial sac; the swelling extends upwards on the front of the thigh, and there is also a remarkable fluctuating swelling posteriorly in the popliteal space (as in the case delineated in Atlas, Plate ix., Fig. 1). He cannot for the last three months stand on this limb. Whenever he throws the weight of his body on it, there is a yielding of the knee, which becomes instantaneously bowed outwards. On these occasions we notice that the internal condyle of the femur projects inwards and descends, while the head of the tibia leans outwards, just as we noticed to have occurred in the preceding case (of J. Lynch) under similar trials. The patient as he lies in bed can extend and flex the leg at the knee-joint, and by an effort he can elevate the whole limb from the horizontal plane of the bed. When the knee-joint is moved, remarkable noises of the rubbing surfaces of bones on each other are distinctly audible. When

we grasp the leg above the ankle, we can easily communicate an abnormal movement at the knee-joint of abduction and adduction ; we can also press firmly against each other the condyles of the femur and head of the tibia, and even strike, in the direction of the long axis of the limb, the sole of the foot from below upwards, and all these experiments give no pain whatsoever to the patient. There is another feature in the case, pointed out to us by the patient himself, namely, that if the limb be gradually flexed at the knee, when the degree of flexion arrives at a certain point, that then a sudden locking, as it were, of the bones occurs. On these occasions a partial subluxation of the bones takes place for a moment ; but when pressure is applied to the front of the knee, or the limb is again extended by the hand, the slightest assistance is found sufficient to enable the articular surfaces to resume again their ordinary relation to each other.

The patient states that, for the last two years, he has felt the left knee-joint very weak, and that latterly it has become swollen, yet that he used to walk about, and even work at his trade, until about three months ago, when, walking through the street, his left knee *suddenly* gave way under him, as if from something having been ruptured or broken within the articulation, and that ever since this occurrence he has been unable to walk, or even stand. The swelling of the joint, it appears, has been truly chronic. Even when the sudden giving way of the knee announced that some rupture of the liga-

mentous structure within the joint had occurred, on this occasion there was no pain felt at the moment, nor did any increase of the swelling follow the accident. The patella is very large, measuring nearly three inches transversely, and can be moved about as if very loosely connected by its ligament to the tibia ; it seems to float, as it were, on the surface of the synovial effusion existing within the joint.

When we examine the other bones of the knee, as far as the swelling permits, besides the hypertrophied condition of the patella already noticed, we find that the head of the tibia is greatly expanded laterally, and we can introduce our fingers behind a ledge of bone, which seems to have arisen from the anterior margin of the tibia, and to have grown perpendicularly upwards for half an inch above this margin ; or it may be, perhaps, that the fibro-synovial capsule of the knee at each side of the ligamentum patellæ has become ossified. When we sink our fingers as deep as can be done into the cavity of the swollen knee-joint, we can detect some few foreign bodies in its interior, and this examination would lead us also to conclude, that the condyles of the femur are altered in form, rendered really smaller than natural, and that the upper part of the expanded tibia is hollowed out, so as to form an abnormal socket to receive them.

The Left Shoulder.—As we stand before the patient, and view the left shoulder in comparison with the right, we observe that it is much altered from its normal form ; its appearance, however, is very

variable. When the patient keeps his elbow to his side, the stump of the shoulder presents a rounded appearance, A, which, upon examination, is found not due to muscular development, but to the existence

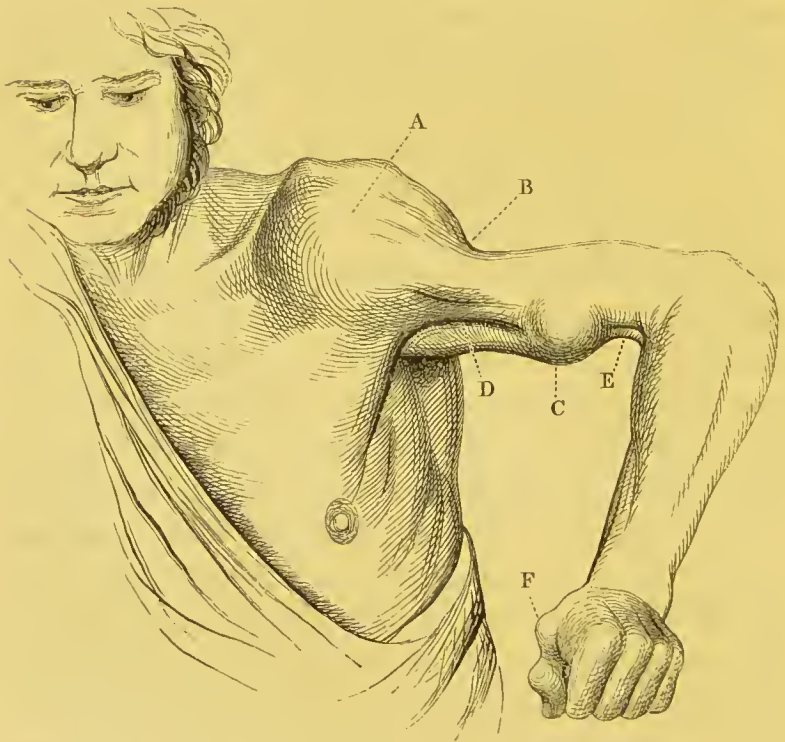


FIG. 31.

Chronic rheumatic arthritis of the shoulder, with abnormal mobility of the joint.

in the interior of the shoulder-joint of a large quantity of synovial fluid. If we desire him to raise his left elbow from his side, as he does so, we are immediately struck with the abnormal appearance the arm presents; just at the point where the deltoid

muscle is inserted into the humerus, a remarkable angle is formed, the sinus, B, of which looks upwards and outwards, just such an appearance as the humerus presents when the head of this bone is dislocated into the axilla, as I believe at such a moment it really is. The patient in this movement feels the rubbing of the bony surfaces on each other; and if the surgeon introduce his fingers high up into the hollow of the axillary cavity, and at the same moment still further abduct the elbow from the side, the head of the humerus is plainly felt by the fingers to be really dislocated into the axilla. If the elbow be first drawn much backwards, and an impulse be given to the shaft forwards, then the head of the bone can be thrown very much towards the clavicle, and be made to present a more obvious tumour in front under the pectoral muscle, than downwards into the axilla. When the head of the humerus is thus displaced forwards, and rotation is communicated to the arm, a remarkable crepitation is perceived, while the head of the bone is felt to obey all the motions given to the shaft.

The region of the shoulder all this time presents a sufficiently plump and rounded appearance, and, in this respect only, differs in its aspect from that which this region assumes when accidental luxation has occurred. In other words, the angular appearance of the shoulder, usual in accidental luxation, is absent, because the space beneath the acromion, abandoned by the head of the bone, is filled up with an inordinate quantity of synovial fluid, which

distends the capsular ligament. As the patient can at will produce the dislocation in question, so also can he voluntarily return the head of the bone back to the centre of the glenoid cavity; and, indeed, I believe the ordinary movements he has been in the habit of performing at his work, so far as the articulation of the left shoulder is concerned, consist altogether in the continual change of place of the head of the humerus from the glenoid cavity into the axilla, and back again from this space to its socket. The patient says that the shoulder-joint feels remarkably loose, but that he can perform all the "under-hand" movements of the upper extremity perfectly, and that he could earn his bread at his trade, were it not for the relaxed condition of his knee, which prevents him standing at his work. When we take hold of the elbow of the patient, and pull the humerus downwards in the direction of its long axis, we find that the bone can be made to descend from the glenoid cavity for the extent of one inch. The capsular ligament must therefore be longer and wider than natural to admit of all this change of position of the head of the humerus, and the margin, too, of the original glenoid cavity is, probably, now so fashioned, that its edge does not afford the same obstacle it ordinarily does to the return of the head of the bone back again to its place in its centre.

The *intra-articular* portion of the tendon of the biceps is in this case, as it ordinarily is in this disease, destroyed; and hence it is that the move-

ments of the head of the humerus are unrestrained in the widened capsular ligament, and that the luxations mentioned are permitted. Then, as to the *extra-articular* portion of the tendon of the muscle, it is seen to form an abnormal line, D, extending from beneath the fold of the pectoral muscle for two inches, before it reaches the upper margin of the belly of the biceps, which is smaller, shorter, and placed lower down than natural; and when, by the will of the patient, this muscle is thrown into action, it forms a prominent rounded tumour, C, about the size of an orange. On these occasions, also, we notice, descending from the lowest part of the muscle, another prominent line, E, which appears to be the lower tendon of the biceps passing to its insertion into the radius.

The patient, upon being questioned as to the previous history of his case, stated he never had what could be called rheumatic fever, but that he has been for many years subject to occasional short attacks of rheumatism; that by these attacks he might be confined to the house for three, or even four days at a time: they were attended with shivering, thirst, and slight exacerbations of fever, but he soon rallied out of them, and was at once able to attend to his business. The pains, he stated, affected principally the muscles, but never the joints until lately. About three years ago he for the first time felt something wrong with the left shoulder, and then the pain was felt first, not in the joint, but at a

point above the middle of the arm,—in short, just where the deltoid muscle is inserted into the humerus: that now all pain is gone, even from this point, at the left arm.

The patient has traces of this disease in some of his other articulations;—the right shoulder erepitates much on motion, and he has pain at the point in this arm just about the insertion of the deltoid muscle—indeed he has just such a sensation here as he formerly had in the same situation in the left, or deformed extremity, and he anticipates (not without reason) that the same changes are about to take place in the right as have already proceeded so far in the left shoulder-joint. The metacarpophalangeal joints of the thumb, \mathbb{F} , and the fingers, show traces of nodosity of their joints. The toes of both feet are evidently affected by the disease; they are arched, their convexity being to the dorsal aspect, and the patient complains of their being painful and stiff.

The patient's pulse is regular, his appetite and digestion good. On analysis of the urine, nothing unusual was discoverable.

The alteration in form of the bones composing the shoulder-joint and knee, as well as the relaxation of their ligamentary connexions, was in this case, as is usual in chronic rheumatic arthritis, accompanied by the chronic synovial effusion already described, the peculiar crackling noises heard on motion, &c. &c.; and all these, toge-

ther with the history of the former and present condition of the patient, point out this as a well-marked case of chronic rheumatic arthritis.

As to the left shoulder-joint, I believe that the glenoid cavity is greatly enlarged; that the capsular ligament has a wide attachment above to the coracoid process and coraco-acromial vault; that the condition called *hydrops articuli* of the synovial sac exists; that the intra-articular portion of the tendon of the biceps is absorbed altogether, so that the head of the bone can move freely, unrestrained by this tendon, in the widened capsule.

It is also evident, that in this case the belly of the biceps muscle has become, as to its upper part, somewhat atrophied, and that its tendon is unfurnished with muscular fibre for two inches lower down beneath the fold of the axilla than it normally should be.

Although those who have studied chronic rheumatic arthritis must necessarily be familiar with the ordinary anatomical characters the tendon of the biceps presents in the dead body as the result of this disease (Plate III., Fig. 3, c), yet the external signs by which such a change is known in the living have not hitherto been noticed nor described by any: and to me it would appear that this case presents us with a good illustration of the external appearances which are to be expected, when the intra-articular portion of the tendon of the biceps has been destroyed as the result of chronic rheumatic arthritis.

The relaxed condition of the left shoulder-joint in this case probably arose from analogous causes to those which presided over the same condition of the left knee-joint. The synovial effusion, the result of chronic synovitis, with which the disease in both joints began, caused an elongation of the synovial capsules, while the loss of the intra-articular part of the long tendon of the biceps had, perhaps, in this case on the shoulder-joint an analogous effect to the loss of the crucial ligaments on the left knee (a lesion which we take it for granted has occurred). The peculiarity of appearance represented by the belly of the biceps muscle depends, probably, on this muscle not having its normal origin from the glenoid cavity of the scapula, but from the humerus, at the summit of the bicipital groove, which is some inches lower down; and it may be a law in the animal economy, that the fleshy part of the muscle should have above it a certain length of tendon, to enable it to perform its functions. I have seen a similar appearance as to the tendon and fleshy belly of this muscle in a case of bony ankylosis of the shoulder-joint, in which, so far as the biceps was concerned, an analogous state of things existed.

With respect to the left knee-joint, we may, perhaps, find the laxity of the union of the bones accounted for by attributing it to a detachment of one or both of the crucial ligaments from the tibia, as well as to the elongation of the lateral ligaments, and over-distention of the capsule, from effusion into its cavity. Although the abnormal mobility

appeared suddenly, still it is probable that it was but the result of the gradual breaking up successively of the fibres of the crucial ligaments; and that it was when the last fibre of these structures gave way, that the abnormal mobility so unexpectedly manifested itself.

In such an advanced stage of chronic rheumatic arthritis of the knee and shoulder-joints as is described in the account given of the foregoing case, it did not appear to me that much benefit was to be expected to be derived from the adoption of any specific line of medical treatment carried on within the walls of an hospital. The patient was therefore detained but a short time in the institution. The principal indication appeared to be, to provide for him such a mechanical appliance as might best counteract the abnormal mobility of the knee, and at the same time aid in inducing an ankylosed condition of the joint, if this were practicable. The instrument which seemed to me best calculated to fulfil these indications was one of those not uncommonly used to support the knee in cases in which this joint has been observed to be deformed, leaning too much outwards or inwards. Such an instrument (Fig. 31) is figured in the valuable work of Bonnet;* but in this we have had constructed, the hinge-joint at the knee has been suppressed, as our

* *Traité de Thérapeutique des Maladies Articulaires.* Par A. Bonnet. Page 345.

object was to render the limb stiff, and, if possible, to induce ankylosis. It was composed of two steel rods, which corresponded respectively to

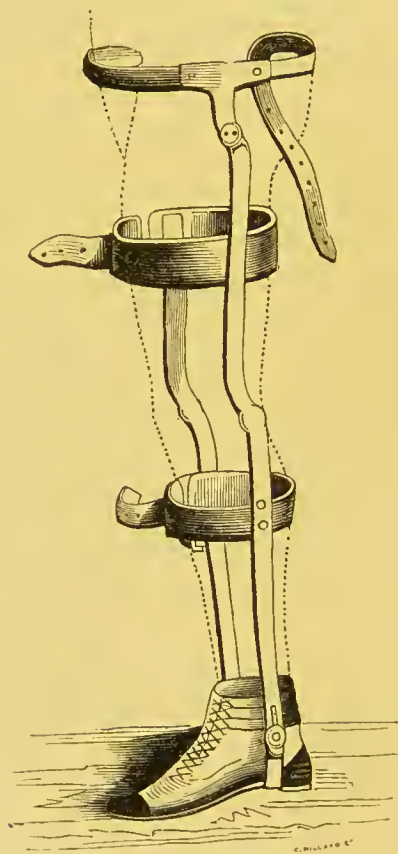


FIG. 32.

Apparatus for the support of the knee-joint applied in the case of Stafford.

the outer and inner sides of the limb. These lateral rods were continuous below, forming a loop or stirrup, the basis of which traversed the sole of a boot, which was laced round the ankle. The

outer steel rod was joined above, transversely, by a leathern girdle, which was strapped around the waist: a hinge-joint in this outer rod, allowing of flexion of the thigh, corresponded to the situation of the hip-joint; while below, in both of these lateral supporters, corresponding to the situation of the ankle, a hinge-joint also existed. Two transverse bars—the one placed behind the centre of the thigh, the other behind the calf of the leg—well padded, and covered with chamois leather, half encircled the limb posteriorly in these two situations, while the circle was completed by leathern straps buckled in front of the leg and thigh.

In this apparatus the limb was secured, and all motion of the knee-joint prevented, while the two hinge-joints existing in the apparatus—one at the level of the hip, and the other at the ankle*—allowed of the necessary movements in walking.

Stafford appeared this morning, January 15, 1857, at the Richmond Hospital, with the above-mentioned apparatus applied, and he stated that he derived the greatest advantage from the use of it, as it enabled him to stand and work at his bench for

* It was found very convenient to the patient to have the boot and lower loop of the instrument, which are incorporated with it, removable at pleasure, without disturbing the rest of the apparatus. This object was accomplished by having the joint of the ankle formed by means of screws and nuts, which last could be readily taken off, and the boot and stirrup removed. The instrument was manufactured by Mr. Read, Parliament-street, instrument maker to the Richmond Hospital.

several hours a day, and it was by its aid he walked from his residence this morning, two miles distant, to the hospital.

We should, however, here also mention, that in addition to the steel apparatus (Fig. 32), the limb was included, from the trochanter major to the ankle, in a case made of sole leather, enveloping the entire circumference of the thigh, knee-joint, and leg, and closely united in front by buckles and straps. This leathern apparatus I advised the patient to wear night and day, in the hopes of inducing ankylosis of the knee-joint. When I say ankylosis, I may take this opportunity of mentioning, that I am not sanguine in the expectation that true *bony* ankylosis will readily take place in this, or indeed in any case of chronic rheumatic arthritis, as this, it appears to me, as I have before stated, is not one of the tendencies of this disease; but I have a hope that a permanent stiffening of the knee or what Cruveilhier calls "articular rigidity" may possibly be induced as the result of such a mode of treatment; and I may add, that the plan above recommended has been steadily persevered in for several weeks, but that the only result as yet to be observed is, that flexion of the limb backwards can now be but partially performed; but although this degree of restraint in the mobility of the joint augurs well as a commencement of ankylosis, still, it is rather unfortunate that the stiffening has not appeared in the direction most desirable; for whenever the patient makes the experiment of throwing

the weight of his body on the limb, or attempting to walk without the aid of the support, the knee-joint yields, and the limb still *bows outwards* as formerly, before the apparatus was applied. Sufficient time, however, has not yet elapsed since he commenced this plan to enable us to judge whether it may ultimately succeed or not; but as a certain degree of articular rigidity has already begun, we may, perhaps, entertain some hopes that some form of ankylosis of the knee-joint may take place, which in this case would be, in my opinion, very desirable.

As patients affected with this form of chronic rheumatic arthritis of the knee, attended with a lax condition of the ligaments of the joint, can move about without pain, it becomes the more necessary to warn them against the bad consequences which may be expected in the ordinary course of this disease (of which the case of Stafford affords us an example), but which unhappy results are the more likely to occur prematurely, should the patient persevere in using the limb, as usually disposed to do, unsupported by any mechanical appliance.

There is at present (27th December) in the Richmond Hospital, under the care of my colleague, Professor Smith, a case of this disease which affects the knee. It is of the hypertrophic form. The patella is fully one inch broader on the affected than on the opposite side, and the breadth of the superior extremity of the tibia gives also an equal increase of an inch in the transverse measurement

of the diseased over the healthy tibia in the same situation. The joint is weak, and bends *out* very much every time the patient walks or throws the weight of his body on the affected limb, but walking does not give him pain ;—in short, he seems now to be affected exactly with the same form of chronic rheumatic disease as that which affects the left knee of Stafford ; but the complaint is in an earlier stage. The following is its history :—

CASE XIX.

CHRONIC RHEUMATIC ARTHRITIS OF THE RIGHT KNEE-JOINT, OF THE HYPERTROPHIC FORM—ABNORMAL MOBILITY OF THE JOINT IN THE LATERAL DIRECTION—FOREIGN BODIES IN THE SYNOVIAL SAC—FREQUENT EXPOSURE OF THE PERSON TO SUDDEN TRANSITIONS OF HEAT AND COLD, AND OVER-EXERTION OF THE JOINT, THE SUPPOSED CAUSES OF THE DISEASE.

JOHN RYAN, aged 41, an active and athletic quay porter, who has been chiefly occupied in attendance on steam-packets, and in lifting heavy burdens on and off board, was admitted on the 21st November, 1856, into the Richmond Hospital. The patient's right knee is of an irregular globular form. A fluctuating swelling exists at each side of the patella, and extends upwards beneath the crureus muscle for two inches. The popliteal space presents also a similar fluctuating swelling posteriorly. The internal condyle of the femur projects very much inwards, while the head of the tibia leans outwards. The patella is unusually broad, measuring transversely three inches and a half, which is one inch more than the breadth of the opposite patella. When we examine deeply the condyles of the femur, we find the lateral articular margins studded round with bony nodules, which are easily distinguished

through the skin. The condyles do not seem to be otherwise enlarged. The superior articular head of the tibia seems greatly expanded, when compared with its fellow of the opposite side, being fully an inch wider than it. The anterior margin of the articular surface of this bone is greatly elevated above the level of the rest of this surface. This margin is rounded, and represents, from side to side, not a level, but an undulating line. The anterior part of the tibia, where the ligamentum patellæ is inserted, is rendered more flat and rounded than usual, not presenting the usual prominent tuberosity.

The patient himself, on his admission, directed our attention to a foreign body which exists in the knee-joint. Sometimes this body will be found high up, being situated one inch higher than the patella: sometimes it is found internal to the inner edge of this bone: sometimes it can be felt external to its outer margin. This body is of a rounded form, about the size of a filbert, and so smooth is its surface, that it slips away under the pressure of the fingers from place to place within the joint. The patient, in walking, finds it occasionally interpose itself between portions of the articular surfaces, causing him a momentary uneasiness. He has also occasionally pain in the joint, of a rheumatic kind, which is usually referred to the inner side of the knee. It is, he says, always most severe in frost and wet weather, particularly the latter. If we lay the palm of the hand flat on the anterior surface of the joint, and alternately flex and extend the joint,

a rough grating sensation is perceived, and crackling sounds are at the same time heard. The patient cannot fully flex the leg. Whenever we attempt to bend the limb for him, so as to make the degree of flexion more acute than a right angle, the patient complains of pain. When he walks, the affected limb bends outwards at the knee. On these occasions the whole limb seems bowed into an arch, with the convexity outwards. The motions of the joint are unaccompanied with pain, but the patient has a sense of weakness in it. We can perform the experiment of pressing against each other, in the vertical direction, the articular surfaces of the affected knee, and we can even forcibly strike the sole of the foot from below upwards, and these manœuvres become the source of no inconvenience whatever to the patient. It is also remarkable, that, with such an amount of apparent disease of the knee, there is no wasting of the thigh nor of the calf of the leg of the affected limb.

We conclude, that the foregoing case is one of chronic rheumatic arthritis, because the pains are influenced by the weather; because, also, of the noises which are heard, and the crepitation which becomes evident on motion being communicated to the joint; to which we may add the great breadth of the patella, and the enlargement of the superior articular extremity of the tibia; the nodulated margins which can be felt through the skin on the lateral edges of the femoral and also on the tibial condyles; the existence of one or

more foreign bodies in the interior of the synovial sac, which is evidently dilated, and somewhat distended with synovial fluid.

When looking, however, for any other evidence of rheumatic disease than this exhibited by the affection of his right knee-joint, we see none except an abnormal arching of the small toes, and a degree of nodosity of the joints, to which we may add, that there is also on the dorsum of the right foot a prominent condition of the extensor tendons, betokening chronic rheumatic disease, and reminding us of the case of Leonard, already described, and whose foot is delineated (Fig. 22, page 254). Ryan also complains of fugitive pains in the opposite leg, extending down the front of the limb to the toes.

It has been stated, that besides the extraordinary laborious exertions which this man's duty subjected him to, daily, for six years, which might have induced the disease in his knee, he was also all the time exposed to great and sudden transitions of temperature during his occupation as steam-packet porter ;—for example, he was sometimes labouring below near to the steam-engine of a vessel, and then suddenly exposed on deck to severe weather, all which were likely to set into action any predisposition to rheumatic arthritis latent in his system.

As to his habits, he states that although he could not be considered a man of uniform temperance, still, that he very seldom exceeded as to drink. He

always felt himself equal to any amount of labour imposed upon him, until about eighteen months ago, when he, for the first time, felt pain in his right knee. This pain was at first accompanied with startings of the limb at night. The joint at this time became considerably swollen and distended with synovial fluid. None of these symptoms, however, appeared to him of much consequence, and he never, on account of them, desisted from labour even for a single day, until the increasing sense of weakness of the limb induced him to apply for advice at the hospital.

The patient has now been six weeks in the house, most of which time he has remained in bed. He has taken hydriodate of potass and cod-liver oil, and both these medicines have been used as external applications to the swollen knee, which has been subsequently treated by compression. Adhesive straps of mercurial ointment and soap plaster have been constantly applied, and the whole limb bandaged ; but little impression has been made on the disease in the knee, except that the soft swelling, or *hydrops articuli*, has been on the whole somewhat diminished. He feels, however, the same weakness in the joint as formerly, and the same inability to follow his laborious occupation as a quay porter : he therefore seems much disappointed, and in a mood unwilling to attend to advice, which certainly should dictate to him the propriety of his abandoning for the future the onerous duties of a quay porter, and of submitting himself to

the only treatment, in my opinion, suitable to his case, namely, to have the limb kept for some time fixed in an apparatus calculated to induce an ankylosed state of the knee, in a position nearly straight. For my part, I must say, that if, instead of adopting this advice, he still will persevere in using his limb unsupported, the ligaments of the affected knee will some day (as in the case of Stafford) suddenly give way, and he shall then be placed in a position difficult to relieve. To be compelled to keep his knee-joint permanently extended he considers a sentence too severe to be submitted to, and he shows a determination not to be amenable to orders as to this point, which is to be regretted.

CASE XX.

CHRONIC RHEUMATIC ARTHRITIS OF BOTH KNEE-JOINTS, WITH GREAT EFFUSION INTO THE SYNOVIAL SAC—ABNORMAL MOBILITY OF THE JOINTS—DEATH FROM ACUTE ARTHRITIS HAVING BEEN SUDDENLY SUPERINDUCED ON THE CHRONIC RHEUMATIC DISEASE OF THE RIGHT KNEE—POST-MORTEM EXAMINATION OF THE JOINTS.

MARY SHERIDAN, a servant, aged 56, was, on the 1st of November, 1852, admitted into the Richmond Hospital, under the care of Dr. Hutton. She had been, on two occasions during the preceding four years, under treatment in the hospital, in consequence of her having been afflicted with erysipelas, followed by chronic rheumatic arthritis of her knee-joints; and the symptoms she laboured under were then carefully noted. As to the *left knee*, it was remarked that the femur projected very much forwards and inwards, while the corresponding head of the tibia was partially displaced outwards and backwards towards the popliteal space, where it could be plainly felt. The leg and foot were rotated outwards. The patella at this side was dislocated completely outwards, and lay on the external surface of the outer condyle of the femur.

When the limb was grasped by the surgeon above the ankle, and at the same time a lateral movement

of abduction was communicated to it, it could be made to form an obtuse angle with the thigh. These movements were the source of no pain to the patient. On examining the joint deeply, a number of foreign bodies could be felt under the fingers. On moving the joint, crepitation was perceived, and loud crackling noises were distinctly audible.

The Right Knee measured nineteen inches in circumference, and was larger than the left. Foreign bodies could be felt in the interior of this joint, and there was also great abnormal mobility of it in the lateral directions. The patient never complained of suffering pain in the joint: erepitating sounds were heard whenever it was moved;—in short, we learned that in almost every particular this chronic disease affected both knee-joints in a nearly similar manner. She found both equally movable when she attempted to stand or walk, which she was unable to do without the aid of two crutches, and the help of some person to support her.

As to the previous history of her case, it was collected from her, that about fifteen years ago, when she was recovering from a severe attack of erysipelas of the right leg and foot, she for the first time observed her right knee swollen. This affection of the joint was attended with little or no pain, but she noticed that the joint was very stiff when she commenced in the morning to use it, and that “eringing noises” accompanied every motion of the joint. Although the swelling gra-

dually increased, she continued to struggle against the defect, and to act, with but little interruption, as a house-servant for nine or ten years, about the termination of which period she was compelled to give up her situation, and go into hospital, as she again became affected with erysipelas, which now engaged the foot and leg of the opposite side. This attack was found to run a similar course to that it had previously done in the right limb; and just as formerly, when she was convalescent from the erysipelas, her left knee then became affected with the chronic swelling, with effusion into the synovial sac. Thus, both her knee-joints having become implicated, she was no longer able, when she left the hospital, to resume her place as a servant. Since this period, for four years up to the 24th of October, 1852, both her knees remained in a nearly passive state of chronic rheumatic disease, when, about the termination of this period, suddenly, without any assignable cause, acute inflammation attacked the right knee-joint, and after seven days of severe suffering she was, on account of it, admitted for the third time into the Richmond Hospital. The notes taken by Dr. Hutton's resident pupil, the late Mr. Bourne, on this occasion, were as follow:—"Both her knee-joints are swollen, but the right much more than the left: the former has been recently visited with acute inflammation, attended with a sudden increase of swelling, with the addition of pain and heat in the part, and with these local symptoms of inflammation are now associated

those of general constitutional disturbance. Suppuration has become established in the joint. A pointing outside the right patella has taken place, and a slough about the size of a crown-piece has formed here. Through the opening thus made there issues from the interior of the joint a large quantity of a sero-purulent matter."

The patient had now a rapid, weak pulse, and was evidently run down by the effects of the recent attack of acute inflammation and its consequences, and in one week her constitution (previously weakened by a chronic bronchial affection) gave way, and she died on the 8th of November, on the fourteenth day after the acute arthritis had supervened on the chronic affection of the right knee.

POST-MORTEM EXAMINATION OF THE JOINTS.

Plaster of Paris casts having been taken of the abnormal knees, they were removed, and a dissection having been made of them by Professor Smith, he laid them before a meeting of the Pathological Society during the winter session of 1852-53.*

Right Knee.—The capsular ligament was exposed: and cut through, and here it presented a cut edge of three lines in thickness. The interior surface of the synovial membrane exhibited a fasciculated ap-

* Professor Smith's observations on this occasion were not reported nor published; he has, however, kindly furnished me with some notes of them, and the joints are before me as I write. They are preserved in the Museum of the Hospital.

pearance: patches of lymph and other traces of recent inflammation existed: some purulent matter was also found contained within the synovial sac of the joint.

The condyles of the femur were much divaricated from each other. A line traversing the condyles, and giving the extreme breadth of the femur at its lowest part, as measured from condyle to condyle, amounted in length to four inches and one-half. The condyles did not extend as much posteriorly towards the popliteal space as they normally do. The inter-condyloid fossa of the femur, viewed from behind, was deeply excavated, and by this, its posterior surface, it had corresponded to the anterior and inner portion of the head of the tibia, which lay behind it. The lateral margins of the condyles, where joined to the inferior articular surface of the bone, were studded round with an exuberant range of bony nodules. In front of the upper part of the trochlea of the femur there were small exostotic elevations, and the greatly thickened synovial membrane was reflected from the front of the femur at a point which was nearly two inches higher up than the superior margin of this trochlea—a circumstance which may give some idea of the over-distension in the direction, upwards, of the synovial capsule. The lower articular part of both condyles of the femur were nearly on the same horizontal level as to each other. The articular surface of the external condyle of the femur which corresponded to the external glenoid cavity of the tibia was completely *polished and eburnated*.

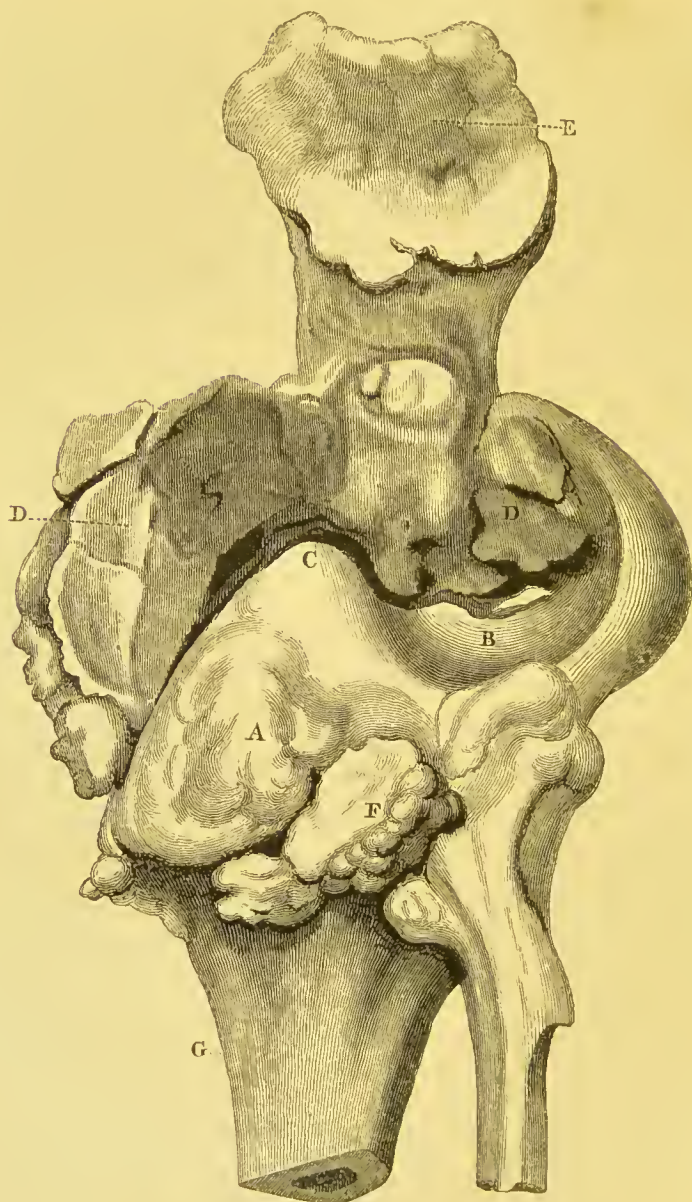


FIG. 33.

Case of Sheridan.—View from behind of the patella, tibia, and fibula of the right knee-joint.

A, C, portion of the tibia, which was not articular, placed behind the internal condyle of the femur; B, outer glenoid cavity, which was articular, highly polished, and elaruated. D, D, crescentic band of bone, including the tubercle of the tibia, detached from the shaft of this bone. This Figure has been reduced to half the size which the abnormal knee had attained.

Tibia.—The superior articular extremity of the *right* tibia was much altered from its normal form, and presented two surfaces, which were contrasted remarkably with each other. The inner, Fig. 33, A, formed a large convex eminence three inches in extent from before backwards, and two inches and a half from side to side, the basis of which was surrounded with bony nodules. This convex surface corresponded to the part of the tibia which had been the original site of the internal glenoid cavity of the bone; this part had of late evidently ceased to be articular, and it was rough and scabrous on its surface. This surface was separated by a prominent spine, C, from that which represented the outer glenoid cavity, B, which was much excavated, and even ground down, as it were, by much use, so that the upper extremity of the fibula, which was flattened, ranged with the tibia, and actually formed part of the knee-joint. The external glenoid cavity thus constituted by the tibia and upper part of the flattened head of the fibula was partially covered with an hypertrophied semilunar cartilage. This fibro-cartilage had attached to its anterior cornu a foreign body as large as a filbert. All the surfaces of the tibia already mentioned were destitute of cartilage or incrustation, and we never have seen the process of eburnation better marked than on the surface which the extremity of the external condyle of the femur and corresponding outer glenoid cavity of the tibia, B, presented. These last-mentioned articular surfaces evidently appeared to

have been the centre of the principal movements the knee-joint had enjoyed.

The *internal condyle* of the femur was placed altogether in front of the eminence, Fig. 33, A, C, which was the original site of the internal glenoid cavity of the tibia, but which, in this example, was, properly speaking, not articular. This portion of bone seemed to have been, as it were, twisted backwards into the popliteal space to the extent of two inches. Thus, while this eminence, Fig. 33, A, lay entirely behind the internal condyle of the femur, the cavity for the reception of this last was provided for in front by the presence of a remarkable transverse band of bone, D, D, shaped into a crescentic arch, concave posteriorly, of considerable thickness, an inch and a half deep, and of length enough to stretch across both condyles of the femur, which were placed behind it. Its anterior convex surface was parallel with the front of the joint, and placed nearly as perpendicular as the patella. One margin was situated superiorly, and the lower margin ranged with the level of the upper part of the tibia, but was only united to it by ligamentary connexions. Posteriorly, towards the joint, it was fully eburnated, and it completed in front, as before mentioned, the receptacle for the internal condyle of the femur. This crescentic arch of bone seemed to have been made up of several pieces, and its centre to be constituted by the tubercle of the tibia, which still gave insertion to the ligament of the patella, although the

tubercle was itself detached from the shaft of the tibia.

How this transverse band of bone, which, with the patella, completed the knee-joint on its anterior aspect, was formed, it is not easy to conceive. Whether this crescentic band was constituted by the upper margin of the tibia, which had first been hypertrophied, and then became separated from the upper part of the shaft, or whether it should be considered a formation of bone altogether new, it is not easy to determine.

The insertion of the ligamentum patellæ into the central part of this crescentic band would imply that the centre of this band is evidently the original tuberosity of the tibia, enlarged and flattened out, and which has become detached ; and this view would give the appearance of probability to the conjecture, that the lateral portions, or alæ, of bone, Fig. 33, D, D, connected with this tubercle were constituted by the original margin of the tibia ; and Professor Smith, I believe, took this view of the matter when he laid the case before the Pathological Society.

The patella was much broader than usual ; its posterior articular surface was perfectly flat, and destitute of cartilage ; its margin was nodulated by the addition of new osseous granules ; its ligament was also broader than usual, and was united laterally to, and almost identified with, the remarkable crescentic band of bone, Fig. 33, D, which was stretched across the front of the joint, as already described.

Besides the foreign body already mentioned as being attached to the anterior extremity of the fibro-cartilage, there were also numerous other foreign bodies contained within the synovial sac: one of them, very large, Fig. 33, F, lay transversely at the back part of the internal condyle of the tibia. There was no trace of crucial ligaments to be seen in the joint.

Left Knee-joint.—The capsular ligament was of equal thickness with that of the right knee-joint, but its internal surface presented no roughness, nor deposit of lymph on it, nor was there any purulent matter seen in its interior. A viscid synovial fluid alone issued from the sac when fully opened. All the structures in the interior of the joint were observed to be in an hyperemic condition. The inter-condyloid fossa of the femur was occupied with vascular synovial fimbriæ. There were no traces whatever of crucial ligaments existing in the articulation. More than twenty foreign bodies were contained within its cavity. Some of these were as large, nearly, as a walnut, and had formed strong attachments: some were smaller, and in clusters, like grapes; they were attached to a common ligamentary stalk, connecting them to an enormously thickened capsular ligament. One of the largest of these foreign bodies occupied the inter-condyloid fossa of the femur, and lay far back, placed transversely. Another foreign body was placed towards the back part of the inner condyle of the femur, in a separate bursa, which, however, was found, on close ex-

amination, to have a communication with the general synovial cavity.

While adverting to the numerous abnormal bur-
sæ which existed around the joint, we should not
omit to notice one, Fig. 34, A, which lay obliquely
across the superior extremity of the tibia, below its
tubercle and the insertion of the ligamentum patellæ.
It was quite superficial, and formed a tumour about
the size of a hen-egg, recognisable during life (and
shown in the cast we possess of the knee). When
cut into, this synovial sac was found to be inter-
sected, says Professor Smith, by delicate membra-
nous bands resembling the cordæ tendineæ of the
heart : it contained two little foreign bodies about
the size of peas. These were connected together
by very fine, but strong membranous cords (see
Fig. 34, A). This bursa communicated with one
of smaller size (by means of a small canal about
the size of a crow-quill), which, as to situation,
corresponded very much to that belonging to the
bursa of the tendons of the inner hamstring mus-
cles : and as this last communicated freely with
the inner part of the knee-joint, a communication
was thus established intermediately between the
cavity of the joint and the bursa first mentioned.

Left Femur.—The transverse measurement of the
lower extremity of the femur, at its broadest part,
amounted only to three inches and one-half, being
exactly one inch less than that of the opposite femur,
measured in the same part. The condyles of the
left femur were smaller than natural : their lateral

margins, where joined to the articular surface, were studded round with the usual characteristic bony nodules (Fig. 34, B). The external condyle seemed

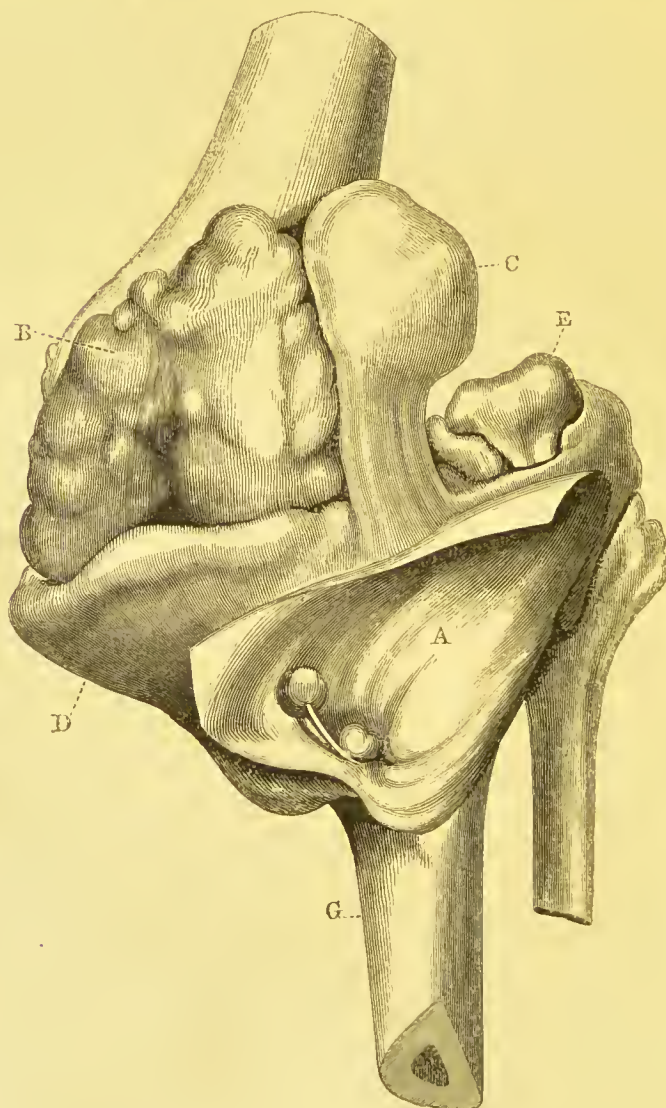


FIG. 34.

Case of Sheridan.—Left knee-joint viewed from before. G, shaft of the tibia drawn backwards into the popliteal space, behind D, the anterior and inner part of the tibia, which was displaced, with the condyle of the femur, forwards and inwards. This Figure has been reduced to about half the size which the abnormal knee had attained.

somewhat atrophied; it did not descend within half an inch of the level of the lower margin of the internal condyle of the femur.

The lower extremity of this bone, not only in the manner in which the lateral margins of its condyles were hemmed round with granular bony nodules, E, but also in the circumstance that pointed exostotic growths surmounted the trochlea, resembled much the specimen of a knee-joint delineated at page 215, Fig. 10. Another point of resemblance between these two last was also to be found in the shortened condition of the external condyle, which by no means descended so low as the internal.

The superior extremity of the tibia had been expanded and hollowed out into an oval cavity, placed transversely, two inches in depth, and measuring fully six inches across, from side to side, and four from before backwards. This cavity was much wider than was necessary to accommodate the diminished condyles of the femur. It would appear as if the upper extremity of the tibia had been first expanded into this immense abnormal articular socket, and had then been disintegrated into two portions by an oblique line of separation, leaving a large portion of the upper extremity of the bone behind, which was the continuation upwards of the shaft of the tibia, projecting for two inches backwards into the popliteal space, and a considerable detached portion in front, D. This anterior and internal portion, Fig. 34, D, of the tibia seemed to supply, by the broad expansion of its

upper articular surface, the internal and external glenoid cavity of the tibia, which included also the tubercle of the bone, and it was into this anterior detached and movable portion, Fig. 34, D, that the lower part of the ligamentum patellæ had been inserted.

The glenoid cavities of the tibia thus formed had resting upon their superior surface the condyles of the femur. No investing cartilage covered any of the surfaces, nor did any fibro-cartilages exist, nor were there any points of eburnation to be seen; but every interstee formed between the bones seemed occupied by rounded foreign bodies of various sizes, already alluded to.

The patella, Fig. 34, C, at this side was luxated completely outwards, so that it thus lay on the lateral aspect of the externale condyle of the femur, presenting its inner margin forwards, its outer backwards, and its cutaneous surface external. The articular surface of the patella was abnormally plane and flat, and destitute of cartilage; its circumference was nodulated.

The ligamentum patellæ had an insertion only into that part of the tibia, D, which was obliquely detached from the shaft of the bone, G. The upper part of this shaft (which was placed behind the line of separation which ran across the articular surface of the tibia) was drawn backwards into the popliteal space, as already mentioned, while the shaft, G, was rotated on its long axis so much outwards, that the fibula was placed nearly behind the tibia.

The abnormal mobility of the knees, which in this case was greater than ever I have seen it, was, I believe, principally owing to the loss, from disease, of the crucial ligaments. It is true, that, independently of this lesion, there existed also a condition of the bones of the knees which had an influence on the action of the muscles inserted into them, which must also be taken into account when considering the causes of the displacement of the bones, and the abnormal mobility in question. For example, it is plain that the power of the great muscular masses in front of the thigh bones, the quadriceps extensors of the legs, had been in this case altogether annulled, because the bony processes of the tibiæ, into which these muscles are inserted, through the intervention of the ligaments of the patellæ, were detached from the shaft of the tibiæ, and hence the patient could not stand upright unsupported, nor could she, as she lay on her back, by any voluntary effort raise her limbs, when extended, from the level of the horizontal plane of the bed. From the same cause of the quadriceps extensors of the legs not having their ordinary fixed points in the tibiæ, the action of the hamstring muscles must have had the effect of drawing upwards and backwards the superior and posterior parts of the heads of the tibiæ into the popliteal spaces, where they were observed to have formed conspicuous prominences.

The termination of the case by a fatal attack of acute arthritis must be considered as an uncommon, but not an unprecedented event. In the year 1841 I had under my care, in the Poor-house Hospital of

the House of Industry, a patient, Mary Christie, fifty-six years of age, who was disabled from earning her bread, from having had for some years chronic rheumatic arthritis in both her knee-joints. She was suddenly seized with an attack of acute arthritis in the right knee, attended with violent fever, which in a few days terminated fatally. In this case the inflammation did not go on to sloughing of the integuments and synovial sac, as in the case of Sheridan. Mr. (now Professor) Smith made the dissection of the right knee-joint in this case, and he laid the results before a meeting of the Pathological Society.

“The right knee-joint was greatly swollen, and when the capsule was opened, purulent matter escaped. The synovial membrane was here and there lined with buff-coloured coagulable lymph, and elsewhere presented an intensely red colour. In some places the cartilages were removed altogether, their places being supplied by a porcellanous deposit, grooved in the lines of flexion and extension. In the condyles of the tibia the cartilages were raised up from the bone, and apparently converted into a thin, flexible, yellow membrane. The interior of the tibia, its cancellated tissue, the medullary membrane of these cancelli, and of the medullary canal itself, all presented evidence of their having been the seat of acute inflammation.”

Although it is necessary for us to bear in mind the possibility of our encountering occasionally cases of chronic rheumatic arthritis terminating as the two immediately preceding, still, I feel I may confidently say that such examples may be regarded

as exceedingly rare;—indeed, it is the usual course in this disease, that the “*hydrops articuli*” shall cease, and the synovial swelling become reduced in size, long before the death of the patient.

For example: I had under my care, in the Richmond Hospital, in November, 1846, the case of a man often before mentioned in this work, P. Donohoe, who had been affected with chronic rheumatic arthritis of the constitutional form in all his articulations. His knee-joints were much distended with synovial fluid, forming remarkable swellings not only in front, corresponding to the lower part of the femur, but posteriorly, in the popliteal space. I had a drawing taken of the right knee-joint about the period of his admission (see Atlas, Plate x., Fig. 1, which represents these appearances). A few years afterwards I visited this patient in the North Union Poor-house Hospital, where he was under the care of Dr. Kirkpatrick, and at this period the synovial fluid had altogether subsided, and at the time of my making the post-mortem examination, nearly ten years after the drawing above referred to had been taken, viz. October, 1846, there was no swelling whatsoever of the synovial sac of the knee-joint, nor was any fluid found within the capsule.

In the following case, the history of which I would next call attention to, it will be found that the patient herself, in her last communication she made to me, regards it as a surprising phenomenon, that the swelling of her knees, which formerly had been considerable, had latterly become so much reduced in size:—

CASE XXI.

CHRONIC RHEUMATIC ARTHRITIS OF THE CONSTITUTIONAL FORM, OF ABOUT FORTY YEARS' STANDING—THE WRISTS, ELBOWS, AND KNEES WERE CONTRACTED AND PAINFUL—THE SYNOVIAL SACS OF THE KNEE-JOINTS WERE FORMERLY MUCH DISTENDED WITH FLUID, BUT LATTERLY THE EFFUSION HAD ALTOGETHER SUBSIDED—NUMEROUS VERY LARGE FOREIGN BODIES COULD BE FELT IN EACH KNEE-JOINT—BOTH PATELLÆ WERE DISLOCATED COMPLETELY OUTWARDS, RENDERING THE ERECT POSITION OF THE BODY IMPOSSIBLE.

Mrs. CASSIDY, when she first consulted me in August, 1830, was about sixty years of age. She stated that she had for the last twenty-five years laboured under a most afflicting disease in all her joints, which, from the appearance of her wrists and hands, it was plain was chronic rheumatic arthritis of the worst form. She complained particularly of her knees, which were painful and semi-flexed, so that she could not straighten them, nor stand upright on her limbs, nor had she been able to do so for years. She added, that she had been advised to stand and to use crutches, but found that she could not, by any effort of her own, or by the assistance of another, stand up or straighten her limbs at the knee-joints.

On examination, it was at once manifest that the patellæ on both sides were dislocated outwards on the lateral aspect of the external condyles of the femora; hence, the knee-joints remained fixed at a right angle, and any effort of the muscles to extend the limbs only increased the degree of flexion.

Mrs. Cassidy had consulted almost every medical man of eminence in Dublin, and also had, by letter, communications relative to her case with some in London, but her disease pursued its slow course unalleviated. I had not much opportunity of watching the progress of this case, for she habitually remained in the country, and only occasionally visited Dublin. One of her letters, however, I have by me, and as it gives a graphic account of this lady's sufferings, I quote her words, as follow:—
“The pains I suffer every night are not to be described. Between one and two o'clock in the morning, on awakening, I actually scream out (without being able to suppress it), so that I can be heard by those far from me. I seldom get half-an-hour's rest at a time until six o'clock in the morning. I am never without the composing pills ordered by you in January, 1833, taking them generally four times a week, and seldom anything else in the shape of medicine. You could scarcely suppose how good is my general health. I think it right to mention, that the swelling in my knees is so much reduced, that now they are little more than of a natural size.”

The pills she speaks of as having afforded her relief were composed as follows :—

R. Pulv. Ipecacuanhæ Compositi, scrupulum.
Extracti Opii Aquosi, grana duo.
Fient pilulæ quatuor, duæ noctæ sumendæ.

She was naturally of an active disposition, and at an early hour daily had herself carried from her bed-room, and, when free from pain, enjoyed the society of her family and friends. She drove out much in the open air, and, fortunately, was in a condition of life which permitted her to possess every species of vehicle she required or wished for.

At the age of 76 she died of a complaint totally unconnected with the chronic rheumatic disease under which she had so long laboured : affording an example of the truth of Haygarth's observation, that—"this is a disease which sadly embitters, but does not shorten the duration of life."

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